This document provides pertinent information concerning the revocation and reissuance of the VPDES Permit listed below. This permit is being processed as a Minor, Municipal permit. The discharge results from the operation of a 0.1 MGD wastewater treatment plant. This permit action consists of updating the proposed effluent limits to reflect the current Virginia Water Quality Standards (effective 6 January 2011) and updating permit language as appropriate. The effluent limitations and special conditions contained within this permit will maintain the Water Quality Standards of 9VAC25-260 et seq.

1.	Facility Name and Mailing Address:	King William Sewage Treatment Plant P.O. Box 5911 Virginia Beach, VA 23471-0911	SIC Code:	4952 WWTP
	Facility Location:	542 Acquinton Church Road King William, VA 23086	County:	King William
	Facility Contact Name:	Jamie Heisig-Mitchell	Telephone Number:	757-460-4220
	Facility Email Address:	jmitchell@hrsd.com		
2.	Permit No.:	VA0088102	Expiration Date:	7 March 2015
	Other VPDES Permits:	VAN030052 – HRSD York River Aggregate Nutrient General Permit		
	Other Permits:	Not Applicable		
	E2/E3/E4 Status:	Not Applicable		
3.	Owner Name:	Hampton Roads Sanitation District		
	Owner Contact / Title:	Jamie Heisig-Mitchell Chief of Technical Services Division	Telephone Number:	757-460-4220
	Owner Email Address:	jmitchell@hrsd.com		
4.	Application Complete Date:	18 August 2014		
	Permit Drafted By:	Douglas Frasier – NRO	Date Drafted:	1 October 2014
			Date Revised:	21 October 2014
	Draft Permit Reviewed By:	Anna Westernik – NRO	Date Reviewed:	6 October 2014
	Draft Permit Reviewed By:	Bradford Ricks – PRO	Date Reviewed:	15 October 2014
				22 October 2014
	Public Comment Period:	Start Date: TBD 2014	End Date:	TBD 2015
5.	Receiving Waters Information:	See **Attachment 1** for the Flow Frequency Determination and 303(d) Status.		
	Receiving Stream Name:	Moncuin Creek*	Stream Code:	8-MNQ
	Drainage Area at Outfall:	23.56 square miles	River Mile:	3.75
	Stream Basin:	York River	Subbasin:	None
	Section:	3	Stream Class:	III
	Special Standards:	None	Waterbody ID:	VAP-F13R
	7Q10 Low Flow:	0.23 MGD	7Q10 High Flow:	3.3 MGD
	1Q10 Low Flow:	0.14 MGD	1Q10 High Flow:	2.4 MGD
	30Q10 Low Flow:	0.49 MGD	30Q10 High Flow:	5.1 MGD
	Harmonic Mean Flow:	Undefined	30Q5 Flow:	1.0 MGD

*The receiving stream may be spelled differently in some of the Attachments; however, it is the same waterway.

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6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

X	State Water Control Law	**X**	EPA Guidelines
X	Clean Water Act	**X**	Water Quality Standards
X	VPDES Permit Regulation	**X**	9VAC25-820 et seq. *General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*
X	EPA NPDES Regulation		

7. Licensed Operator Requirements: Class III

8. Reliability Class: Class I

9. Facility / Permit Characterization:

	Private	**X**	Effluent Limited		Possible Interstate Effect
	Federal	**X**	Water Quality Limited		Compliance Schedule
	State		Whole Effluent Toxicity Program		Interim Limits in Permit
X	POTW	**X**	Pretreatment Program		Interim Limits in Other Document
	eDMR Participant	**X**	Total Maximum Daily Load (TMDL)		

10. Wastewater Sources and Treatment Description:

The treatment consists of influent screening via bar rack, followed by an equalization tank and fine screen prior to the dual train membrane bioreactors. The membrane bioreactors have pre and post anoxic zones. There are chemical feed systems to meter in alum for phosphorus removal and for alkalinity adjustment to optimize the plant's nutrient removal performance. The final effluent is disinfected by ultraviolet radiation and is reaerated by a cascade structure.

See **Attachment 2** for a facility schematic/diagram.

TABLE 1
OUTFALL DESCRIPTION

Number	Discharge Sources	Treatment	Design Flow	Latitude / Longitude
001	Domestic wastewater	See Section 10	0.1 MGD	37° 42′ 24″ / 77° 08′ 39″
See **Attachment 3** for the King William topographic map.				

11. Sludge Treatment and Disposal Methods:

Sludge is transported to the HRSD – West Point Sewage Treatment Plant (VA0075434) for further treatment with final disposal via the Waste Management Middle Peninsula Regional Landfill.

12. Other Permitted Discharges Located Within Waterbody VAP-F13R:

TABLE 2
PERMITTED DISCHARGES

Permit Number	Facility Name	Type	Receiving Stream
VA0091537	Mount Olive Wastewater Treatment Facility	Municipal Discharge Individual Permit	Mallory Creek

TABLE 2 (continued)			
Permit Number	Facility Name	Type	Receiving Stream
VAG840082	NPPC King William	Non Metallic Mineral Mining General Permit	Moncuin Creek, UT Jackpen Creek, UT
VAG110241	Concrete Pipe & Precast LLC – Ashland Plant	Concrete Products General Permit	Totopotomy Creek Totopotomy Creek, UT

13. Material Storage:

TABLE 3 MATERIAL STORAGE		
Materials Description	Volume Stored	Spill/Stormwater Prevention Measures
Glycerin	380 gallons	Stored in 55-gallon drums. Feed drums are in containment. Storage drums are under roof.
Magnesium hydroxide	300 gallons	
Alum	380 gallons	
Carbon	1600 gallons	Stored in 800-gallon enclosed vessels.

14. Site Inspection:

Inspection was performed by PRO Compliance staff on 30 December 2009.

Refer to **Attachment 4** for the inspection report.

15. Receiving Stream Water Quality and Water Quality Standards:

a. Ambient Water Quality Data

During the 2012 305(b)/303(d) Integrated Water Quality Assessment Report, Moncuin Creek was assessed as a Category 5D waterbody (i.e. The Water Quality Standard is not attained where TMDLs for a pollutant(s) have been developed but one or more pollutants are still causing impairment requiring additional TMDL development).

The stream is impaired for the Recreation Use due to *E. coli* exceedances, the Aquatic Life Use due to pH exceedances (natural conditions are suspected) and the Fish Consumption Use due to PCB fish tissue value exceedances. In addition, mercury is considered a non-impairing observed effect for the Fish Consumption Use.

The Recreation Use impairment was addressed as part of the Bacteria Total Maximum Daily Load Development for the Pamunkey River Basin, March 2006, which was approved by the EPA on 2 August 2006 and by the SWCB on 27 June 2007. The facility was added to the TMDL during a subsequent modification and initially received a wasteload allocation of 8.71E+10 *E. coli* cfu/year. The TMDL was subsequently modified again on 22 June 2009 to increase the wasteload allocation to 1.74E+11 *E. coli* cfu/year based on a design flow of 0.1 MGD.

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b. 303(d) Listed Stream Segments with Total Maximum Daily Loads (TMDLs)

TABLE 4 INFORMATION ON DOWNSTREAM 303(d) IMPAIRMENTS WITH TMDLs					
Waterbody Name	Impaired Use	Cause	TMDL completed	WLA	Basis for WLA
Pamunkey River Basin	Recreation	*E. coli*	Pamunkey River Basin Bacterial TMDL 2 August 2006 Modified 22 June 2009	1.74E+11 cfu/year	126 cfu/100 mL *E. coli* --- 0.1 MGD
Chesapeake Bay	Aquatic Life	Total nitrogen	Chesapeake Bay TMDL 29 December 2010	Aggregated	Edge of Stream (EOS) Loads
		Total phosphorus			
		Total suspended solids			

This facility discharges directly to Moncuin Creek; located within the Chesapeake Bay watershed. The receiving stream has been addressed in the Chesapeake Bay TMDL, completed by the Environmental Protection Agency (EPA) on 29 December 2010. The TMDL addresses dissolved oxygen (D.O.), chlorophyll a and submerged aquatic vegetation (SAV) impairments in the main stem Chesapeake Bay and its tidal tributaries by establishing non-point source load allocations (LAs) and point-source wasteload allocations (WLAs) for total nitrogen (TN), total phosphorus (TP) and total suspended solids (TSS) to meet applicable Virginia Water Quality Standards contained in 9VAC25-260-185. This facility is considered part of the HRSD York River Aggregate and has been assigned wasteload allocations per 9VAC25-820-70.

Implementation of the Chesapeake Bay TDML is currently accomplished in accordance with the Commonwealth of Virginia's Phase I Watershed Implementation Plan (WIP); approved by EPA on 29 December 2010. The approved WIP recognizes that the TMDL nutrient WLAs for Chesapeake Bay wastewater dischargers are set in two regulations: 1) the Water Quality Management Planning Regulation (9VAC25-720); and 2) the *General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed of Virginia* (9VAC25-820). The WIP states that since TSS discharges from wastewater facilities represent an insignificant portion of the Bay's total sediment load, they may be considered aggregated and wastewater discharges with technology-based TSS limits are considered consistent with the TMDL.

40 CFR 122.44(d)(1)(vii)(B) requires permits to be written with effluent limits necessary to meet water quality standards and to be consistent with the assumptions and requirements of applicable WLAs. DEQ has provided coverage under the VPDES Nutrient General Permit (GP) for this facility via the HRSD York River Aggregate, permit VAN030052. The requirements of the Nutrient GP currently in effect for this facility are consistent with the Chesapeake Bay TMDL. This individual permit includes technology-based TSS limits that are also consistent with the Chesapeake Bay TMDL and WIP. In addition, the individual permit addresses limitations for the protection of instream dissolved oxygen concentrations as detailed in Section 19 of this Fact Sheet. The proposed effluent limits within this individual permit are consistent with the Chesapeake Bay TMDL and will not cause an impairment or observed violation of the standards for D.O., chlorophyll a or SAV as required by 9VAC25-260-185.

The planning statement and 2012 303(d) Fact Sheets can be found in **Attachment 1**.

c. Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream, Moncuin Creek, is located within Section 3 of the York River Basin and has been designated Class III water.

At all times, Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, a temperature that does not exceed 32° C and maintain a pH of 6.0 – 9.0 standard units (S.U.).

The Freshwater Water Quality / Wasteload Allocation Analysis located in **Attachment 5** details other water quality criteria applicable to the receiving stream. Some Water Quality Criteria are dependent on the pH, temperature or total hardness of the receiving stream and/or the final effluent. These known values were utilized when determining the criterion for the following pollutants; as applicable.

pH and Temperature for Ammonia Criteria

The fresh water, aquatic life Water Quality Criteria for ammonia is dependent on the instream pH and temperature. Since the effluent may have an impact on the instream values, the pH and temperature values of the effluent must also be considered when determining the ammonia criteria for the receiving stream. The 90th percentile pH and temperature values are utilized as they best represent the critical conditions of the receiving stream.

Staff reevaluated the receiving stream ambient monitoring data and the facility's effluent data for pH and temperature to establish ammonia criteria and the subsequent reasonable potential analysis. Ambient data found in **Attachment 6** provided pH and temperature values from June 1995 – June 2009. Effluent pH data from April 2010 to July 2014 may be located in **Attachment 7**. A default temperature value of 28º C and an assumed temperature value of 15° C for summer and winter, respectively, were utilized since effluent temperature data was not readily available.

The ammonia water quality criteria calculations are shown in **Attachment 5**.

Hardness Dependent Metals Criteria

The Water Quality Criteria for some metals are dependent on the receiving stream and/or effluent total hardness values (expressed as mg/L calcium carbonate). The permittee collected five (5) samples during the month of July 2014 as supplemental data for the reissuance package; however, it was noted that the facility was experiencing technical issues associated with the chemical feed system used to increase alkalinity for plant performance requirements. This alkalinity control subsequently increases the effluent hardness levels. On 8 September 2014, the permittee submitted additional hardness and zinc data which was collected after the problems were rectified. This recent hardness data is indicative of the current operations at this plant and was utilized in determining the metals criteria. It is staff's best professional judgement that the hardness data submitted with the reissuance application is not valid since it does not represent normal plant operations; therefore, data submitted in September will be utilized in determining metals criteria. Refer to **Attachment 7** for effluent data reported during the previous permit term and the submitted supplemental data during this reissuance process.

Ambient data collected at DEQ monitoring station 8-MNQ004.19 was utilized to obtain the average stream hardness. See **Attachment 6** for the ambient data.

The hardness dependent metals criteria in **Attachment 5** are based on average values of 103.9 mg/L and 19 mg/L for the final effluent and the receiving stream, respectively. It should be noted that water quality standards are valid within the range of 25 – 400 mg/L for hardness; the program self adjusts for out-of-range values (i.e. 19 mg/L would equate to 25 mg/L).

Bacteria Criteria

The Virginia Water Quality Standards at 9VAC25-260-170.A state that the following criteria shall apply to protect primary recreational uses in surface waters:

E. coli bacteria per 100 mL of water shall not exceed the following:

	Geometric Mean[1]
Freshwater *E. coli* (N/100 mL)	126

[1]For a minimum of four weekly samples taken during any calendar month

d. Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, Moncuin Creek, is located within Section 3 of the York River Basin. This section has not been designated with a special standard.

16. Antidegradation (9VAC25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

It is staff's best professional judgement that the receiving stream be classified as Tier 1 based on the noted downstream impairments and the 2004 stream model ensuring that limitations maintain the water quality standards within the receiving stream (**Attachment 11**). The proposed permit limits have been established by determining wasteload allocations which will result in attaining and/or maintaining all water quality criteria which apply to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points are equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLAs) are calculated. The WLA values for both aquatic and human health are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. In the case of ammonia evaluations, limits are needed if the 97^{th} percentile of the thirty-day average effluent concentration value is greater than the chronic WLA. Effluent limitations are then calculated on the most limiting WLA, the required sampling frequency and statistical characteristics of the effluent data.

a. Effluent Screening

Effluent data obtained from Attachment A monitoring, the permit application, including supplemental data, and April 2010 – July 2014 Discharge Monitoring Reports (DMRs) have been reviewed and determined to be suitable for evaluation.

Please refer to **Attachment 7** for a summary of effluent data.

The following pollutants require a wasteload allocation analysis as sample results were noted above the agency-specified quantification levels per Attachment A monitoring results: copper, lead, nickel and zinc. The previous permit contained a schedule for the facility to achieve compliance with a new zinc limit. The permit was later modified to allow the facility additional time to comply due to an identified treatment system failure. During this permitting action, staff will be reevaluating the applicability of a zinc limit based on new information submitted by the permittee. It should also be noted that the limitation for zinc does not become effective until 1 February 2015.

In addition, this is a facility treating domestic sewage. Therefore a wasteload allocation analysis will also be necessary for ammonia.

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b. Mixing Zones and Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$WLA = \frac{C_o [Q_e + (f) (Q_s)] - [(C_s) (f) (Q_s)]}{Q_e}$$

Where:
- WLA = Wasteload allocation
- C_o = In-stream water quality criteria
- Q_e = Design flow
- Q_s = Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; harmonic mean for carcinogen-human health criteria; 30Q10 for ammonia criteria; and 30Q5 for non-carcinogen human health criteria)
- f = Decimal fraction of critical flow
- C_s = Mean background concentration of parameter in the receiving stream.

The Water Quality Standards contain two distinct mixing zone requirements. The first requirement is general in nature and requires the "use of mixing zone concepts in evaluating permit limits for acute and chronic standards in 9VAC25-260-140.B". The second requirement is specific and establishes special restrictions for regulatory mixing zones "established by the Board".

The Department of Environmental Quality uses a simplified mixing model to estimate the amount of mixing of a discharge with the receiving stream within specified acute and chronic exposure periods. The simplified model contains the following assumptions and approximations:

- The effluent enters the stream from the bank, either via a pipe, channel or ditch.
- The effluent velocity isn't significantly greater (no more than 1 – 2 ft/sec greater) than the stream velocity.
- The receiving stream is much wider than its depth (width at least ten times the depth).
- Diffusive mixing in the longitudinal direction (lengthwise) is insignificant compared with advective transport (flow).
- Complete vertical mixing occurs instantaneously at the discharge point. This is assumed since the stream depth is much smaller than the stream width.
- Lateral mixing (across the width) is a linear function of distance downstream.
- The effluent is neutrally buoyant (e.g. the effluent discharge temperature and salinity are not significantly different from the stream's ambient temperature and salinity).
- Complete mix is determined as the point downstream where the variation in concentration is 20% or less across the width and depth of the stream.
- The velocity of passing and drifting organisms is assumed equal to the stream velocity.

Staff derived wasteload allocations where parameters are reasonably expected to be present in an effluent and where effluent data indicate the pollutant is present in the discharge above quantifiable levels. With regard to the Outfall 001 discharge, ammonia, as N is likely present since this is a wastewater treatment plant treating domestic sewage and Attachment A data indicated metals are present in the discharge as listed in Section 17.a. above. As such, **Attachment 8** details the mixing analysis results while the wasteload allocation derivations, reflecting the mixing analysis results, for these pollutants are found in **Attachment 5**.

c. Effluent Limitations, Outfall 001 – Toxic Pollutants

9VAC25-31-220.D. requires limitations be imposed where a discharge has a reasonable potential to cause or contribute to an instream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9VAC25-31-230.D requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1) Ammonia as N/TKN

Staff reevaluated pH and temperature data; utilizing this information to determine ammonia water quality criteria, wasteload allocations (WLAs) and subsequent reasonable potential analysis (**Attachment 9**). DEQ guidance suggests using a sole data point of 9.0 mg/L for discharges containing domestic sewage to ensure the evaluation adequately addresses the potential for the presence of ammonia within a discharge of treated domestic sewage. The evaluation ascertained that no limits are warranted for this discharge; however, in order to maintain water quality in the receiving stream per the 2004 stream model, requirements found within the aggregated Nutrient General Permit, the Chesapeake Bay TMDL and antibacksliding provisions found in 9VAC25-31-220.L., continuation of the current TKN limitations discussed below is necessary.

The toxicity of ammonia is dependent on the pH of the effluent and/or receiving stream. Ammonia can exist as both "ionized ammonia" (NH_4) and "un-ionized ammonia" (NH_3). Research has shown that the un-ionized ammonia is the fraction that is toxic to aquatic life while the ionized ammonia has been found to have little or no toxic effect. Furthermore, it has been demonstrated that the un-ionized fraction increases correspondingly with rising pH values; thus, increasing potential toxicity.

It is generally accepted that total Kjeldahl nitrogen (TKN) consists of approximately 60% ammonia in raw wastewater. As the waste stream is treated, the ammonia component of TKN is converted to nitrate (NO_3) and nitrite (NO_2). It is estimated that a facility achieving a TKN limit of 3.0 mg/L essentially removes ammonia from the waste stream, resulting in a ′self-sustaining′ quality effluent that protects against ammonia toxicity.

It is staff's best professional judgement that the current TKN monthly average limit of 3.0 mg/L ensures protection of water quality at all times and will be carried forward in this reissuance. The weekly average limit will be 4.5 mg/L based on a multiplier of 1.5 times the monthly average.

Note: The Environmental Protection Agency (EPA) finalized new, more stringent ammonia criteria in August 2013; possibly resulting in significant reductions in ammonia effluent limitations. It is staff's best professional judgement that incorporation of these criteria into the Virginia Water Quality Standards is forthcoming. This and many other facilities may be required to comply with these new criteria during their next respective permit terms. Implications, if any, in regards to the above TKN assumptions are not known at this time.

2) Total Residual Chlorine (TRC)

Chlorine is not utilized for disinfection at this facility; therefore, not expected to be present within the discharge. A limit derivation is not warranted.

3) Metals/Organics

Limits are not warranted for copper, lead, nickel or zinc. See **Attachment 10** for the reasonable potential analysis for each of these metals.

Staff ascertained that due to current chemical additions for alkalinity adjustments at this facility, limitations for zinc are not warranted. The subsequent effluent hardness values correspond to metals biologically unavailable to aquatic life; thus, making them essentially harmless within the water column. However, should operations change at this facility and hardness values decline, a reevaluation may become necessary during future permitting actions.

d. Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants

No changes to dissolved oxygen (D.O.), carbonaceous-biochemical oxygen demand-5 day ($cBOD_5$), total suspended solids (TSS), total Kjeldahl nitrogen (TKN) and pH limitations are proposed.

Dissolved oxygen, $cBOD_5$ and total Kjeldahl nitrogen limitations are based on the stream modeling conducted in March 2004 (**Attachment 11**) and are set to maintain the water quality standards in the receiving stream and to meet the DEQ swamp limits at the downstream boundary. It should be noted that the model does include a 0.15 MGD flow tier for future expansions; however, that flow tier was not requested by the permittee and is not reflected in this reissuance.

The limitations for total suspended solids are based on Federal Effluent Guidelines for Secondary Treatment Standards found at 40 CFR 133.102.

pH limitations are set at the water quality criteria.

E. coli limitations are in accordance with the Water Quality Standards at 9VAC25-260-170.

e. Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients

VPDES Regulation 9VAC25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries. Only concentration limits are now found in the individual VPDES permit when the facility installs nutrient removal technology. The basis for the concentration limits is 9VAC25-40 – *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed*.

This facility has coverage under 9VAC25-820 – *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited and otherwise regulated under the general permit and not this individual permit. This facility has coverage under the HRSD York River Aggregate General Permit; the permit number is VAN030052. Total Nitrogen Annual Loads and Total Phosphorus Annual Loads from this facility are found in 9VAC25-720 – *Water Quality Management Plan Regulation* which sets forth TN and TP maximum wasteload allocations.

Monitoring for total Kjeldahl nitrogen, total nitrogen and total phosphorus are included in this permit. The monitoring is needed to protect the Chesapeake Bay Water Quality Standards. Monitoring frequencies are set at the frequencies as set forth in 9VAC25-820. Annual average effluent limitations, as well as monthly and year to date calculations, for total nitrogen and total phosphorus are included in this individual permit. The annual average for total nitrogen is based on the technology installed as part of a Water Quality Improvement Fund (WQIF) grant #440-S-10-01 while total phosphorus annual average is based on projected performance as stated in a final HRSD Preliminary Engineering Report (PER) submitted in October 2007and per DEQ guidance GM07-2008.

f. Effluent Limitations and Monitoring Summary

The effluent limitations are presented in Section 19. Limits were established for carbonaceous-biochemical oxygen demand-5 day ($cBOD_5$), total suspended solids (TSS), total Kjeldahl nitrogen (TKN), pH, dissolved oxygen (D.O.), *E. coli*, total nitrogen (annual average) and total phosphorus (annual average). Monitoring and reporting is required for flow, total nitrogen (monthly and year-to-date) and total phosphorus (monthly and year-to-date).

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and then a conversion factor of 3.785.

Sample frequencies are in accordance with the recommendations in the current VPDES Permit Manual and Guidance Memo No. 07-2008, Amendment 2; *Permitting considerations for facilities in the Chesapeake Bay watershed*, Appendix A, in regards to nutrient monitoring and reporting.

The permittee requested that the sample type be changed from four hour composite samples (4H-C), as recommended in the VPDES Permit Manual, to eight hour composite (8H-C) during the last reissuance. This sample type will be carried forward with this reissuance and affects cBOD, TSS, TKN and total phosphorus.

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for cBOD and TSS (or 65% for equivalent to secondary). Part I.A. requires operation in accordance with this requirement.

18. Antibacksliding:

During the last permit reissuance, DEQ staff ascertained that a zinc limitation was warranted. A compliance schedule was included with the reissuance allowing the facility adequate time to comply with the new limitation. This schedule was later amended due to setbacks on a proposed treatment process unit. The new deadline to comply is 1 February 2015. During this reissuance, new information was presented that included alkalinity control for enhanced treatment of the domestic sewage. This chemical addition resulted in an increase in total hardness in the effluent. DEQ staff conducted a reasonable potential analysis to determine if the zinc limitation was still warranted. It was ascertained that the limit is no longer warranted. This action conforms to the provisions of Section 402(o) of the Clean Water Act, 9VAC25-31-220.L of the VPDES Permit Regulations and 40 CFR 122.44 based on new information/plant operations and that the proposed limitation derived during the last reissuance is not yet effective. However, it is staff's best professional judgement that the facility monitor for total hardness on a quarterly basis and zinc annually during this permit term to ensure water quality is being maintained.

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19. Effluent Limitations/Monitoring Requirements:

Design flow is 0.1 MGD.

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	1,3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
$cBOD_5$	3,5	13 mg/L 4.9 kg/day	20 mg/L 7.6 kg/day	NA	NA	1/W	8H-C
Total Suspended Solids (TSS)	1,9	30 mg/L 11 kg/day	45 mg/L 17 kg/day	NA	NA	1/W	8H-C
Dissolved Oxygen (DO)	3,5	NA	NA	5.0 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	3,5	3.0 mg/L 1.1 kg/day	4.5 mg/L 1.7 kg/day	NA	NA	1/W	8H-C
E. coli (Geometric Mean) [a.]	3,8	126 n/100mL	NA	NA	NA	2D/W	Grab
Total Hardness (mg/L $CaCO_3$)	2	NL mg/L	NA	NA	NA	1/Q	Grab
Zinc, Total Recoverable	2	NL µg/L	NA	NA	NA	1/Y	Grab
Total Nitrogen – Year to Date [b. c.]	6	NL mg/L	NA	NA	NA	1/M	Calculated
Total Nitrogen – Calendar Year [b. c.]	4,6,9	4.0 mg/L	NA	NA	NA	1/Y	Calculated
Total Phosphorus – Year to Date [c.]	6	NL mg/L	NA	NA	NA	1/M	Calculated
Total Phosphorus – Calendar Year [c.]	6,7,9	0.3 mg/L	NA	NA	NA	1/Y	Calculated

The basis for the limitations codes are:

1. Federal Effluent Requirements (40 CFR 133.102)
2. Best Professional Judgement
3. Water Quality Standards
4. WQIF Grant #440-S-10-01
5. Stream Model – **Attachment 11**
6. 9VAC25-40 (Nutrient Regulation)
7. HRSD Preliminary Engineering Report – October 2007
8. Pamunkey River Basin Bacterial TMDL
9. Chesapeake Bay TMDL/WIP

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.
2D/W = Two days a week.
1/W = Once every week.
1/2W = Once every two weeks.
1/M = Once every month.
1/Q = Once every calendar quarter.
1/Y = Once every calendar year.

8H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 8-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of eight (8) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum eight (8) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15 minutes.

a. Samples shall be collected between 10:00 a.m. and 4:00 p.m.

b. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

c. See Section 20.a. for more information on the Nutrient Calculations.

The quarterly monitoring periods shall be January through March, April through June, July through September, and October through December.
The DMR shall be submitted no later than the 10th day of the month following the monitoring period.

The annual monitoring period shall be January through December.
The DMR shall be submitted no later than January 10th of the following calendar year.

(The remainder of this page intentionally left blank)

20. Other Permit Requirements:

a. Part I.B. of the permit contains quantification levels and compliance reporting instructions

9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D. requires limits to be imposed where a discharge has a reasonable potential to cause or contribute to an instream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the nitrogen and phosphorus parameters shall be in accordance with the calculations set forth in 9VAC25-820 – *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits**.**

b. Part I.C. of the permit details the requirements of a Pretreatment Program

Hampton Roads Sanitation District (HRSD) is required to implement an approved pretreatment program in accordance with the Pretreatment Regulations (9VAC25-31-800). The HRSD pretreatment program encompasses all their plants. Since the King William STP is under control of the HRSD's wastewater treatment system, it too must receive a pretreatment condition in the permit even though the facility currently does not have any significant industrial users. Should this facility begin to receive a discharge from a significant industrial user, HRSD will need to develop local limits for this treatment plant and issue a permit to the significant industrial discharger per Part I.C. of this permit.

21. Other Special Conditions:

a. 95% Capacity Reopener. The VPDES Permit Regulation at 9VAC25-31-200.B.4 requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. This facility is a POTW.

b. Indirect Dischargers. Required by VPDES Permit Regulation, 9VAC25-31-200.B.1 and B.2 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

c. O&M Manual Requirement. Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190.E. The permittee shall maintain a current Operations and Maintenance (O&M) Manual. The permittee shall operate the treatment works in accordance with the O&M Manual and shall make the O&M Manual available to Department personnel for review upon request. Any changes in the practices and procedures followed by the permittee shall be documented in the O&M Manual within 90 days of the effective date of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

d. CTC, CTO Requirement. The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct (CTC) prior to commencing construction and to obtain a Certificate to Operate (CTO) prior to commencing operation of the treatment works.

e. Licensed Operator Requirement. The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9VAC25-31-200.C., and by the Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals Regulations (18VAC160-20-10 et seq.) requires licensure of operators. This facility requires a Class III operator.

f. Reliability Class. The Sewage Collection and Treatment Regulations at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. The facility is required to meet a reliability Class of I.

g. Water Quality Criteria Reopener. The VPDES Permit Regulation at 9VAC25-31-220.D. requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should effluent monitoring indicate the need for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.

h. Sludge Reopener. The VPDES Permit Regulation at 9VAC25-31-220.C. requires all permits issued to treatment works treating domestic sewage (including sludge-only facilities) include a reopener clause allowing incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the CWA. The facility includes a sewage treatment works.

i. Sludge Use and Disposal. The VPDES Permit Regulation at 9VAC25-31-100.P; 220.B.2, and 420 through 720 and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. The facility includes a treatment works treating domestic sewage.

j. Treatment Works Closure Plan. This condition establishes the requirement to submit a closure plan for the treatment works if the treatment facility is being replaced or is expected to close. This is necessary to ensure treatment works are properly closed so that the risk of untreated wastewater discharge, spills, leaks and exposure to raw materials is eliminated and water quality maintained. Section §62.1-44.21 requires every owner to furnish when requested plans, specification and other pertinent information as may be necessary to determine the effect of the wastes from his discharge on the quality of state waters, or such other information as may be necessary to accomplish the purpose of the State Water Control Law.

k. E3/E4. 9VAC25-40-70.B. authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

l. Nutrient Reopener. 9VAC25-40-70.A. authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9VAC25-31-390.A. authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

m. Total Maximum Daily Load (TMDL) Reopener. Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan or other wasteload allocation prepared under section 303 of the Act.

22. Permit Section Part II.

Required by VPDES Regulation 9VAC25-31-190, Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Changes to the Permit from the Previously Issued Permit:

a. Special Conditions:

- The compliance schedule for zinc was removed with this reissuance as new chemical additions have enhanced the effluent quality such that a limit is no longer warranted.

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b. Monitoring and Effluent Limitations:

- Loading limits for cBOD and TKN were changed from grams to kilograms per current agency practice.
- The zinc limit of 52 µg/L was removed with this reissuance as new information and reevaluation of the reasonable potential analysis indicate that a limit is not warranted as water quality is maintained.
- Monitoring requirements for both total hardness and total recoverable zinc were added for this permit term to ensure water quality is maintained.
- The weekly average loading limit was corrected from 7.4 kg/d to 7.6 kg/d due to a mathematical error during previous reissuances.
- The sampling frequency for bacteria was increased from once per week (1/W) to two days every week (2D/W) to reflect the current VPDES Permit Manual recommendations.

c. Other:

- The drainage area and receiving stream critical flows were updated per the Flow Frequency Determination memo dated 27 August 2014 (**Attachment 1**).

24. Variances/Alternate Limits or Conditions:

During the previous reissuance, HRSD requested that the sample type for composites be 8 hour in lieu of the VPDES Permit Manual recommendation of 4 hour composites which is based on the design flow of a plant. The 8 hour composite will be carried forward with this reissuance.

25. Public Notice Information:

First Public Notice Date: TBD 2014 Second Public Notice Date: TBD 2014

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected and copied by contacting the: DEQ Northern Regional Office; 13901 Crown Court; Woodbridge, VA 22193; Telephone No. 703-583-3873, Douglas.Frasier@deq.virginia.gov. See **Attachment 12** for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

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26. Additional Comments:

Previous Board Action(s):	Not applicable.
Staff Comments:	Annual permit fees were confirmed current on 8 August 2014. This permit is being revoked and reissued prior to the 7 March 2015 expiration date at the request of HRSD staff in order to incorporate changes in the operation of the treatment plant; altering the hardness levels found in the final effluent and pending zinc limitations. The request was received on TBD; appropriate fees were paid on TBD. The DEQ-PRO Planning Staff has reviewed the draft permit and determined that the discharge is in conformance with the existing planning documents for the area. This discharge is not controversial. The King William County Board of Supervisors Chairman (Otto O. Williams), County Administrator (Trenton L. Funkhouser) and Executive Director of the Middle Peninsula Planning District Commission (Lewis L. Lawrence III) were notified of the public comment period via the United States Postal Service dated **TBD** 2014 in accordance with the Code of Virginia, §62.1-44.15:01.
State/Federal Agency Comments:	Virginia Department of Health had no objections to this permit reissuance.
Public Comments:	No comments were received during the public notice.
Owner Comments:	

Fact Sheet Attachments

Table of Contents

King William Sewage Treatment Plant
VA0088102
2015 Reissuance

ATTACHMENT 1

Flow Frequency Determination
303(d) Status

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060

SUBJECT: Flow Frequency Determination / 303(d) Status
King William STP – VA0088102

TO: Douglas Frasier

FROM: Jennifer Palmore, P.G.

DATE: August 27, 2014

COPIES: File

The Hampton Roads Sanitation District's King William Sewage Treatment Plant discharges to Monquin Creek near Manquin, VA. The outfall is located at rivermile 8-MNQ003.75. Flow frequencies have been requested for use in developing effluent limitations for the VPDES permit.

The flow frequencies were determined by drainage area proportion between the discharge point and the DEQ's continuous record gauge on Totopotomoy Creek near Studley, VA (#01673550). The gauge is located at the Route 606 Bridge in Hanover County. The values for the gauge and the discharge point are presented below.

Totopotomoy Creek near Studley, VA (#01673550):
Drainage area - 26.2 mi^2
Statistical period - 1978-2003

1Q30 = 0.06 cfs	High Flow 1Q10 = 4.2 cfs
1Q10 = 0.24 cfs	High Flow 7Q10 = 5.6 cfs
7Q10 = 0.39 cfs	High Flow 30Q10 = 8.8 cfs
30Q10 = 0.85 cfs	HM = Undefined
30Q5 = 1.8 cfs	

Monquin Creek at discharge point:
Drainage Area = 23.56 mi^2

1Q30 = 0.05 cfs (0.03 MGD)	High Flow 1Q10 = 3.8 cfs (2.4 MGD)
1Q10 = 0.22 cfs (0.14 MGD)	High Flow 7Q10 = 5.0 cfs (3.3 MGD)
7Q10 = 0.35 cfs (0.23 MGD)	High Flow 30Q10 = 7.9 cfs (5.1 MGD)
30Q10 = 0.76 cfs (0.49 MGD)	HM = Undefined
30Q5 = 1.6 cfs (1.0 MGD)	

This analysis does not address any withdrawals, discharges, or springs influencing the flow. The high flow months are January through May.

The water quality data for monitoring station 8-MNQ004.19 is attached. The monitoring station is located on Monquin Creek at the Route 618 Bridge which is approximately 0.44 miles upstream of the discharge.

During the 2012 305(b)/303(d) Integrated Water Quality Assessment Report, Monquin Creek was assessed as a Category 5D waterbody ("The Water Quality Standard is not attained where TMDLs for a pollutant(s) have been developed but one or more pollutants are still causing impairment requiring

additional TMDL development.") The applicable fact sheets are attached. The stream is impaired of the Recreation Use due to E. coli exceedances, the Aquatic Life due to pH exceedances (natural conditions are suspected), and the Fish Consumption Use due to PCB fish tissue value exceedances. In addition, mercury is considered a non-impairing observed effect for the Fish Consumption Use.

The Recreation Use impairment was addressed as part of the "Bacteria Total Maximum Daily Load Development for the Pamunkey River Basin, March 2006", which was approved by the EPA on August 2, 2006 and by the SWCB on June 27, 2007. The facility was added to the TMDL during a subsequent modification and initially received a wasteload allocation of 8.71E+10 E. coli cfu/year. The TMDL was subsequently modified again on June 22, 2009 to increase the wasteload allocation to 1.74E+11 E. coli cfu/year based on a design flow of 0.100 MGD.

The facility was also addressed in the Chesapeake Bay TMDL, which was approved by the EPA on 12/29/2010. The TMDL allocates loads for total nitrogen, total phosphorus, and total suspended solids to protect the dissolved oxygen and submerged aquatic vegetation acreage criteria in the Chesapeake Bay and its tidal tributaries. The discharge is included in the aggregated loads for non-significant wastewater dischargers in the tidal freshwater Pamunkey River estuary (PMKTF). The nutrient allocations are administered through the Watershed Nutrient General Permit; the TSS allocations are considered aggregated and facilities with technology-based TSS limits are considered to be in conformance with the TMDL.

Monquin Creek was deemed a Tier 1 waterbody during the 2004 modeling effort and antidegradation was not applied. Because the facility is currently discharging at permit limits calculated using Tier 1, Monquin Creek remains a Tier 1 water.

If you have any questions concerning this analysis, please let me know.

2012 Fact Sheets for 303(d) Waters

RIVER BASIN: York River Basin **HYDROLOGIC UNIT:** 02080106

STREAM NAME: **Monquin Creek, Webb Creek**

TMDL ID: **F13R-04-BAC** **2012 IMPAIRED AREA ID:** VAP-F13R-04

ASSESSMENT CATEGORY: 4A **TMDL DUE DATE:** 2014

IMPAIRED SIZE: 12.39 - Miles **Watershed:** VAP-F13R

INITIAL LISTING: 2002

UPSTREAM LIMIT: Headwaters of Webb Creek

DOWNSTREAM LIMIT: Swamp at river mile 2.0

From the headwaters of Webb Creek downstream to the swampy area around river mile 2.0.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Recreation Use - Not Supporting

IMPAIRMENT: E. coli

In 1998, Moncuin Creek was assessed as fully supporting but threatened of the Recreation use because of fecal coliform exceedances at the Route 618 bridge.

In the 2002 cycle, the segment was extended to incorporate the station on Webb Creek and was assessed not supporting of the Recreation Use because of fecal coliform exceedances. The TMDL was due in 2014. The impairment converted to E. coli during the 2006 cycle.

During the 2008 cycle, the bacteria TMDL was addressed as part of the Pamunkey River Basin Bacteria TMDL, which was approved by the EPA on 8/2/2006. This should be considered a Category 4A water.

The exceedance rate was 5/23 at 8-MNQ004.19 during the 2010 cycle. No additional E. coli data was collected in the 2012 cycle.

IMPAIRMENT SOURCE: Point Sources, Nonpoint Sources

Allocations were given to both point and nonpoint sources in the watershed.

RECOMMENDATION: Implementation

2012 Fact Sheets for 303(d) Waters

RIVER BASIN: York River Basin **HYDROLOGIC UNIT:** 02080106

STREAM NAME: **Moncuin Creek, Webb Creek**

TMDL ID: **F13R-04-PCB** **2012 IMPAIRED AREA ID:** VAP-F13R-04

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2022

IMPAIRED SIZE: 12.39 - Miles **Watershed:** VAP-F13R

INITIAL LISTING: 2010

UPSTREAM LIMIT: Headwaters of Webb Creek

DOWNSTREAM LIMIT: Swamp at river mile 2.0

From the headwaters of Webb Creek downstream to the swampy area around river mile 2.0.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Fish Consumption Use - Not Supporting

IMPAIRMENT: PCBs

During the 2010 cycle, Moncuin and Webb Creeks were assessed as impaired of the Fish Consumption Use due to exceedances of the PCB tissue value. PCBs exceeded in yellow bullhead catfish in 2003 and American eel in 2008.

IMPAIRMENT SOURCE: Unknown

The source of the PCBs is considered unknown.

RECOMMENDATION: Problem Characterization

2012 Fact Sheets for 303(d) Waters

RIVER BASIN: York River Basin **HYDROLOGIC UNIT:** 02080106

STREAM NAME: **Moncuin Creek, Webb Creek**

TMDL ID: **F13R-04-PH** **2012 IMPAIRED AREA ID:** VAP-F13R-04

ASSESSMENT CATEGORY: 5C **TMDL DUE DATE:** 2014

IMPAIRED SIZE: 12.39 - Miles **Watershed:** VAP-F13R

INITIAL LISTING: 2002

UPSTREAM LIMIT: Headwaters of Webb Creek

DOWNSTREAM LIMIT: Swamp at river mile 2.0

From the headwaters of Webb Creek downstream to the swampy area around river mile 2.0.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting

IMPAIRMENT: pH

In the 2002 cycle, the segment was assessed as not supporting of the Aquatic Life because of pH exceedances. The TMDL is due in 2014. During the 2012 cycle, the segment remains impaired for pH:

pH 3/18 at 8-MNQ004.19 (Rt. 618)
pH 3/12 at 8-MNQ007.65 (Rt. 611)
pH 4/12 at 8-WEB002.00 (Rt. 610)

Natural conditions are suspected, therefore the water is considered a Category 5C water.

IMPAIRMENT SOURCE: Natural Conditions

Natural conditions suspected source of pH exceedances.

RECOMMENDATION: Problem Characterization

ATTACHMENT 2

Facility Schematic/Diagram

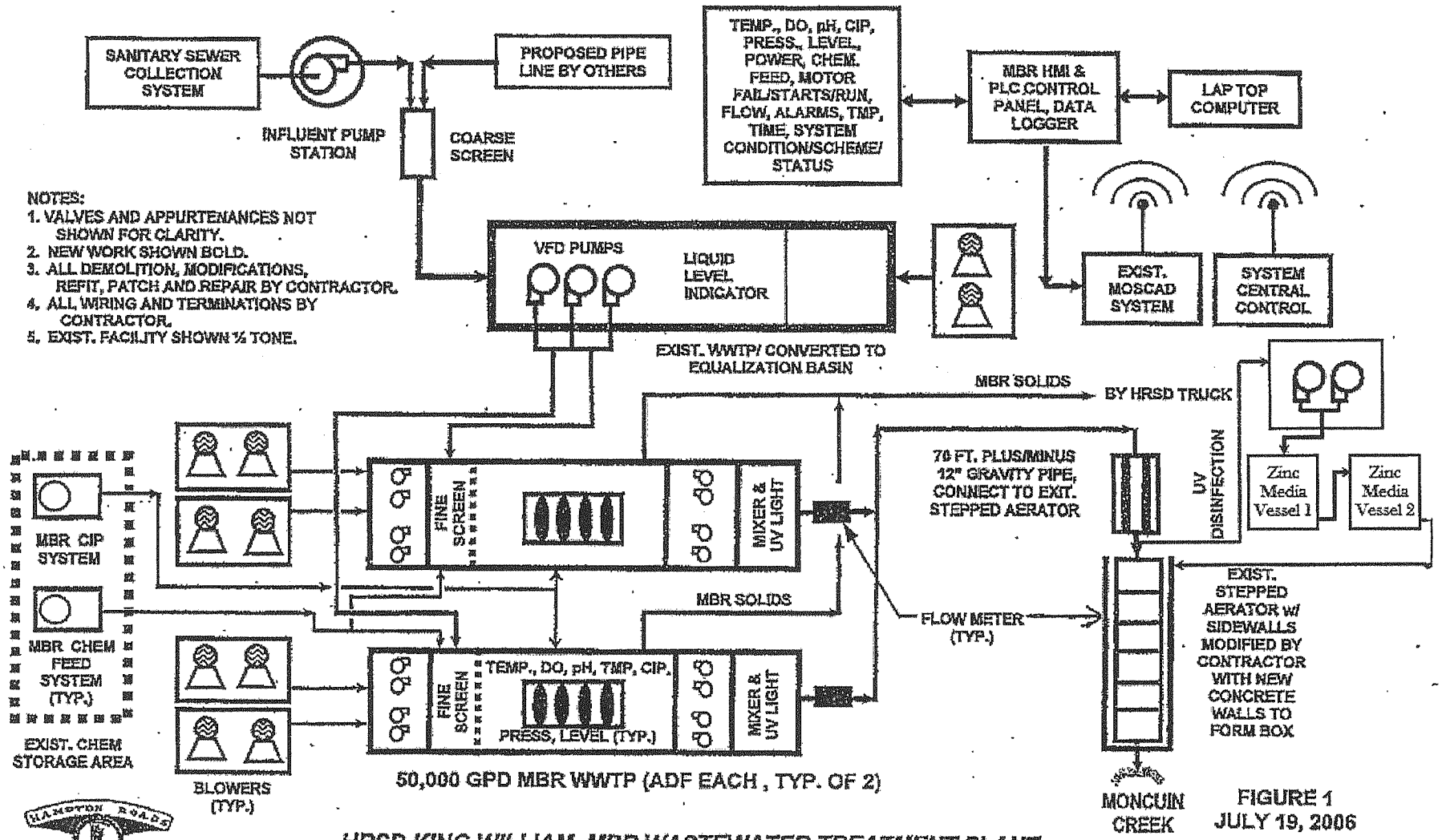


FIGURE 1
JULY 19, 2006

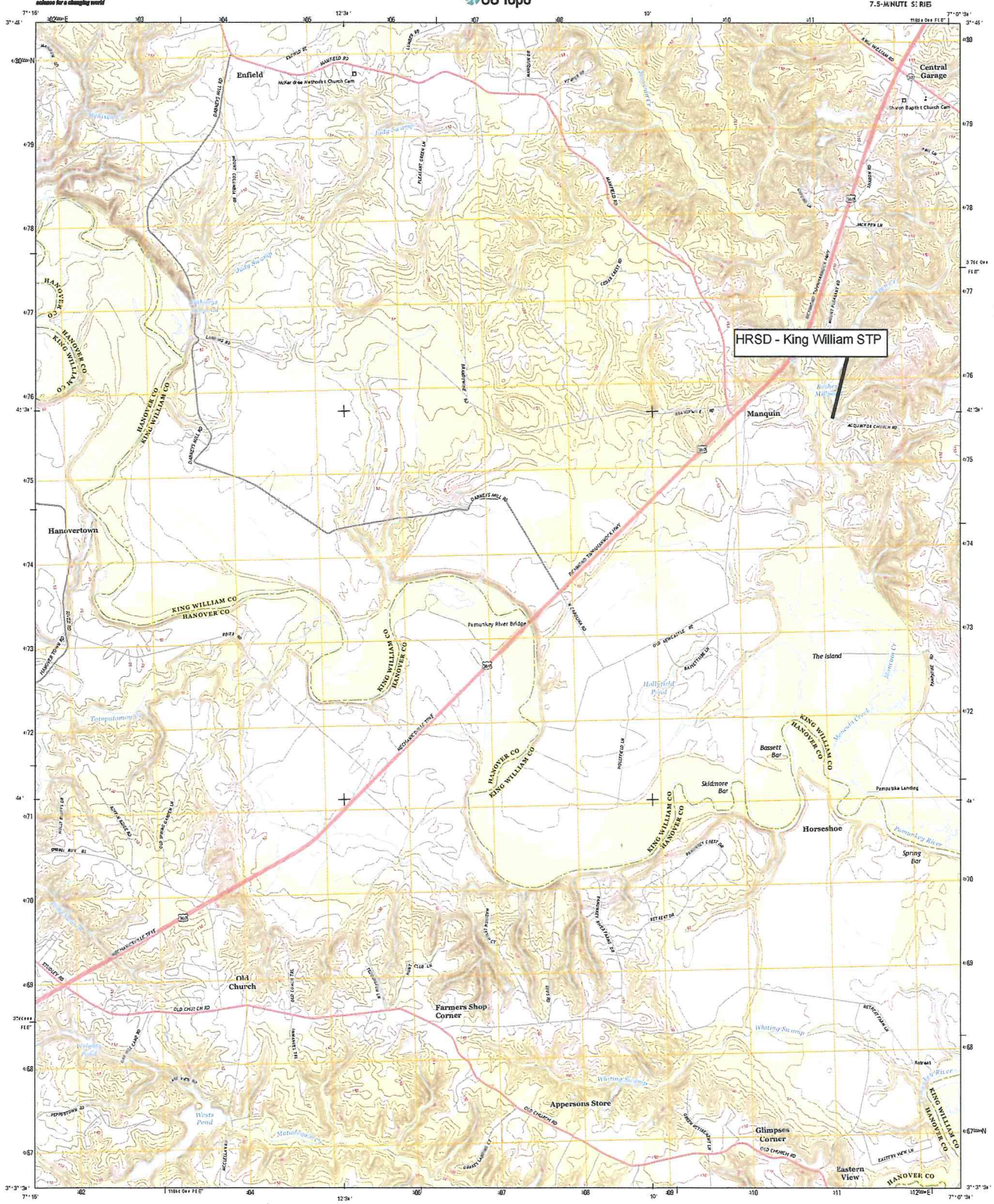
HRSD KING WILLIAM MBR WASTEWATER TREATMENT PLANT

NOT TO SCALE

015230007-5

ATTACHMENT 3

Topographic Map



U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

MANQUIN QUADRANGLE
VIRGINIA
7.5-MINUTE SERIES

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011. A metadata file associated with this product is draft version 0.6.11

MANQUIN, VA
2013

ATTACHMENT 4

Inspection Report

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
PIEDMONT REGIONAL OFFICE
4949-A Cox Road, Glen Allen, Virginia 23060
(804) 527-5020 Fax (804) 527-5106
www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

February 25, 2010

Mr. Zack Crowell
HRSD
P.O. Box 387
Hartfield, VA 23071-0387

RE: VPDES Permit No., VA0088102, King William Co. STP

Dear Mr. Crowell:

Enclosed are copies of the report(s) generated from my inspection of the King William STP on December 30, 2009. I found the treatment facility to be in good working order and producing a good quality effluent. The Operator in charge at the time of the inspection, Mr. Justin Barker, exhibited proficiency in the appropriate sampling and analysis techniques.

Since no deficiencies or problems were noted during the inspection, no response to this correspondence or the report is required. However, if you or Mr. Barker have any questions, comments or information to add to the official record, please feel free to contact me at the above address or by phone at (804) 527-5060.

Sincerely,

Charles R. Stitzer
Environmental Inspector

Enclosures (3)
cc: DEQ, PRO – Compliance file

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Piedmont Regional Office

UNSCHEDULED INSPECTION REPORT

FACILITY NAME:	HRSD-King William STP	**INSPECTOR:**	Charles Stitzer
PERMIT No.:	VA0088102	**INSPECTION DATE:**	December 30, 2009
TYPE OF FACILITY:	Municipal Minor	**TIME OF INSPECTION:**	1500-1645 hrs
COUNTY/~~CITY~~:	King William	**REPORT COMPLETED:**	February 5, 2010
REVIEWED BY:	Heather Howe 2.19.10 Dunaway 2.24.10	**UNANNOUNCED INSPECTION:**	YES
PRESENT DURING INSPECTION:	Justin Barker, John White (DEQ intern)		

INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

Facility Address: 542 Acquinton Church Road, King William Co. (near Rt. 360, VSH 618 and VSH 661)
Mailing Address: HRSD P.O. Box 5911 Virginia Beach, VA 23471
Contact: Zack Crowell: Office 804-843-2920, Cell 804-815-8782

The wastewater treatment plant is a dual train membrane bioreactor unit utilizing UV disinfection and cascade aeration. The treatment units are enclosed so visual observation of their interior is not possible in a routine inspection. The treatment units are well constructed and installed and appear to be working as designed. The effluent at the cascade aerator was very clear.

The grounds are well maintained with some groundcover established. All traffic areas are hardened with crush run gravel. There is no evidence of excessive erosion from the recent construction.

The WWTP is manned 8 hours per day, 7 days per week. The operator on duty at the time of the inspection was Mr. Justin Barker.

The STP laboratory is very small, but well outfitted for analyzing field parameters. TSS, Fecal Coliform, TKN, $CBOD_5$ are performed at Central Environmental Laboratory, 1432 Air Rail Avenue, Virginia Beach, Va.

Copies:
HRSD, Zack Crowell
DEQ – PRO Compliance file

Virginia Department of Environmental Quality

WASTEWATER FACILITY INSPECTION REPORT

FACILITY NAME: King William WWTP	**INSPECTION DATE:** 12/30/09		
	INSPECTOR Charles Stitzer		
PERMIT No.: VA0088102	**REPORT DATE:** February 5, 2010		
TYPE OF FACILITY: ☐ Municipal ☑ Small Minor ☐ Industrial ☐ Federal	**TIME OF INSPECTION:**	1500 Arrival	1545 Departure
	TOTAL TIME SPENT (including prep & travel)	10 hours	
PHOTOGRAPHS: ☑ Yes ☐ No	**UNANNOUNCED INSPECTION?** ☑ Yes ☐ No		
REVIEWED BY / Date: Heather Aware 2-19-10 CRS ADunaway 2.24.10			
PRESENT DURING INSPECTION: Justin Barker, John White (DEQ intern)			

TECHNICAL INSPECTION

1. Has there been any new construction? • If so, were plans and specifications approved? Comments:	☐ Yes ☑ No
2. Is the Operations and Maintenance Manual approved and up-to-date? Comments:	☑ Yes ☐ No
3. Are the Permit and/or Operation and Maintenance Manual specified licensed operator being met? Comments:	☑ Yes ☐ No
4. Are the Permit and/or Operation and Maintenance Manual specified operator staffing requirements being met? Comments:	☑ Yes ☐ No
5. Is there an established and adequate program for training personnel? Comments:	☑ Yes ☐ No
6. Are preventive maintenance task schedules being met? Comments:	☑ Yes ☐ No
7. Does the plant experience any organic or hydraulic overloading? Comments:	☐ Yes ☑ No
8. Has there been any bypassing or overflows since the last inspection? Comments:	☐ Yes ☑ No
9. Is the standby generator (including power transfer switch) operational and exercised regularly? Comments:	☑ Yes ☐ No
10. Is the plant alarm system operational and tested regularly? Comments:	☑ Yes ☐ No

VA DEQ Wastewater Facility Inspection Report

Permit #	VA0088102

TECHNICAL INSPECTION

11. Is sludge disposed of in accordance with the approved sludge management plan? Comments:	☑ Yes ☐ No
12. Is septage received? • If so, is septage loading controlled, and are appropriate records maintained? Comments:	☐ Yes ☑ No
13. Are all plant records (operational logs, equipment maintenance, industrial waste contributors, sampling and testing) available for review and are records adequate? Comments:	☑ Yes ☐ No

14. Which of the following records does the plant maintain?

☑ Operational logs ☑ Instrument maintenance & calibration

☑ Mechanical equipment maintenance ☐ Industrial Waste Contribution (Municipal facilities)

Comments:

15. What does the operational log contain?

☑ Visual observations ☑ Flow Measurement ☑ Laboratory results ☑ Process adjustments

☐ Control calculations ☐ Other (specify)

Comments:

16. What do the mechanical equipment records contain?

☑ As built plans and specs ☑ Manufacturers instructions ☑ Lubrication schedules

☑ Spare parts inventory ☑ Equipment/parts suppliers

☐ Other (specify)

Comments:

17. What do the industrial waste contribution records contain (Municipal only)?

☐ Waste characteristics ☐ Impact on plant ☐ Locations and discharge types

☐ Other (specify)

Comments: **NA**

18. Which of the following records are kept at the plant and available to personnel?

☐ Equipment maintenance records ☑ Operational log ☐ Industrial contributor records

☐ Instrumentation records ☑ Sampling and testing records

Comments: Kept for one day and then sent to main office for archiving

19. List records not normally available to plant personnel and their location:

Comments: personnel records, routine correspondence all kept at main office

20. Are the records maintained for the required time period (three or five years)? Comments:	☑ Yes ☐ No

VA DEQ Wastewater Facility Inspection Report

Permit #	VA0088102

UNIT PROCESS EVALUATION SUMMARY SHEET

UNIT PROCESS	APPLICABLE	PROBLEMS*	COMMENTS
Sewage Pumping	x		*6 pump stations*
Flow Measurement (Influent)	x		
Screening/Comminution	x		*Bar Screen and fine screen*
Grit Removal	x		
Oil/Water Separator			
Flow Equalization			
Ponds/Lagoons			
Imhoff Tank			
Primary Sedimentation			
Trickling Filter			
Septic Tank and Sand Filter			
Rotating Biological Contactor			
Activated Sludge Aeration			
Biological Nutrient Removal	x		*Membrane bioreactor*
Sequencing Batch Reactor			
Secondary Sedimentation			
Flocculation			
Tertiary Sedimentation			
Filtration			
Micro-Screening			
Activated Carbon Adsorption			
Chlorination			
Dechlorination			
Ozonation			
Ultraviolet Disinfection	x		*4 bulbs - spares available*
Post Aeration			
Flow Measurement (Effluent)	x		
Land Application (Effluent)			
Plant Outfall	x		*Difficult to view. Effluent viewed at cascade aerator*
Sludge Pumping			
Flotation Thickening (DAF)			
Gravity Thickening			
Aerobic Digestion			
Anaerobic Digestion	x		
Lime Stabilization			
Centrifugation			
Sludge Press			
Vacuum Filtration			
Drying Beds			
Thermal Treatment			
Incineration			
Composting			
Land Application (Sludge)			

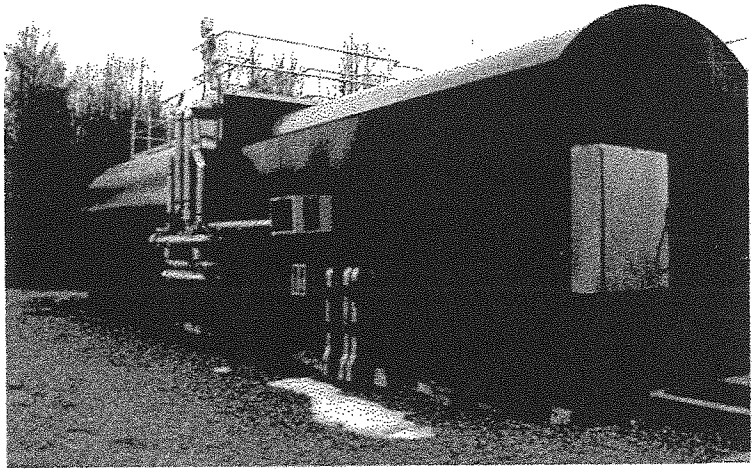
* Problem Codes

1. Unit Needs Attention
2. Abnormal Influent/Effluent
3. Evidence of Equipment Failure
4. Unapproved Modification or Temporary Repair
5. Evidence of Process Upset
6. Other (explain in comments)

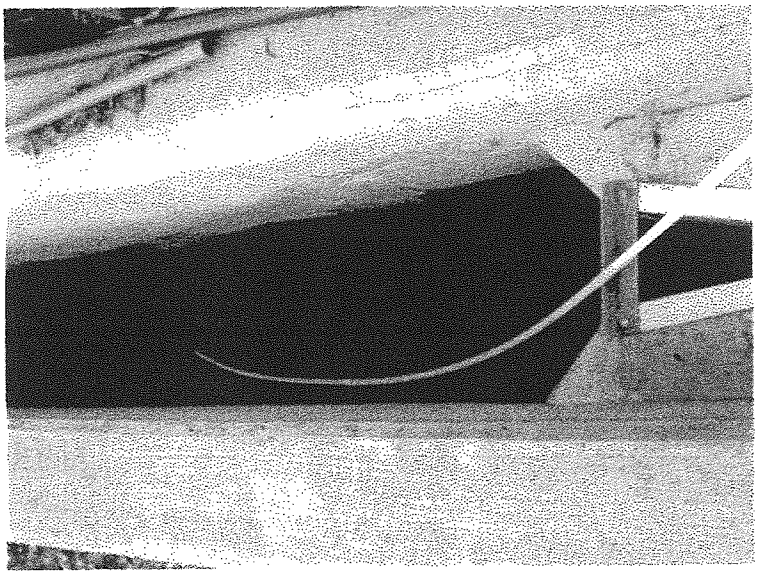
INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

The wastewater treatment plant is a dual train membrane bioreactor unit utilizing UV disinfection and cascade aeration. The treatment units are enclosed so visual observation of their interior is not possible in a routine inspection. The treatment units are well constructed and installed and appear to be working as designed. The effluent at the cascade aerator was very clear

PHOTOS



Membrane Bio Reactor



Cascade aerator

VA DEQ Wastewater Facility Inspection Report

Permit #	VA0088102

EFFLUENT FIELD DATA: Not obtained

Flow	MGD	**Dissolved Oxygen**	mg/L	**TRC (Contact Tank)**	mg/L
pH	S.U.	**Temperature**	°C	**TRC (Final Effluent)**	mg/L

Was a Sampling Inspection conducted? ☐ Yes (see Sampling Inspection Report) ☑ No

CONDITION OF OUTFALL AND EFFLUENT CHARACTERISTICS:

1. Type of outfall: ☐ Shore based ☐ Submerged Diffuser? ☐ Yes ☑ No

2. Are the outfall and supporting structures in good condition? ☐ Yes ☐ No

3. Final Effluent (evidence of following problems): ☐ Sludge bar ☐ Grease
   ☐ Turbid effluent ☐ Visible foam ☐ Unusual color ☐ Oil sheen

4. Is there a visible effluent plume in the receiving stream? ☐ Yes ☑ No

5. Receiving stream: ☑ No observed problems ☐ Indication of problems (explain below)

Comments: Plant is relatively new and was well installed. Working as designed

REQUIRED CORRECTIVE ACTIONS:

None

NOTES and COMMENTS:

None

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
LABORATORY INSPECTION REPORT

Form Updated 10/4/2001

FACILITY NO:	INSPECTION DATE:	PREVIOUS INSP. DATE:	PREVIOUS EVALUATION:	TIME SPENT:
V0088102	December 30, 2009	May 10, 2007	No deficiencies	10 hours w/ travel & report

NAME/ADDRESS OF FACILITY:	FACILITY CLASS:	FACILITY TYPE:	UNANNOUNCED INSPECTION?
Location: King William WWTF 542 Acquinton Church Road King William Co., VA Mail to: HRSD P.O. Box 5911 Virginia Beach, VA 2341	( ) MAJOR ( ) MINOR (X) SMALL ( ) VPA/NDC	(X) MUNICIPAL ( ) INDUSTRIAL ( ) FEDERAL ( ) COMMERCIAL LAB	(X) YES ( ) NO **FY-SCHEDULED INSPECTION?** ( ) YES (X) NO

INSPECTOR(S):	REVIEWERS:	PRESENT AT INSPECTION:
Charles Stitzer	Heather Horne 2.19.10 Allison Dunaway 2.24.10	Justin Barker, John White (DEQ intern)

LABORATORY EVALUATION	DEFICIENCIES? Yes	No
LABORATORY RECORDS		X
GENERAL SAMPLING & ANALYSIS		X
LABORATORY EQUIPMENT		X
DISSOLVED OXYGEN ANALYSIS PROCEDURES		X
pH ANALYSIS PROCEDURES		X
TOTAL RESIDUAL CHLORINE ANALYSIS PROCEDURES		X

QUALITY ASSURANCE/QUALITY CONTROL

Y/N	QUALITY ASSURANCE METHOD	PARAMETERS	FREQUENCY
N	REPLICATE SAMPLES		
N	SPIKED SAMPLES		
Y	STANDARD SAMPLES		
N	SPLIT SAMPLES		
N	SAMPLE BLANKS		
N	OTHER		
Y	EPA-DMR PE SAMPLES? DMRQA??	RATING: ( ) No Deficiency ( ) Deficiency (X) NA	
N	QC SAMPLES PROVIDED?	RATING: ( ) No Deficiency ( ) Deficiency (X) NA	

COPIES TO: (X) DEQ - PRO; ( ) OWCP; (X) OWNER; ( ) EPA-Region III; ( ) Other:

FACILITY #: VA0088102

LABORATORY RECORDS SECTION

LABORATORY RECORDS INCLUDE THE FOLLOWING:

X	SAMPLING DATE	X	ANALYSIS DATE	X	CONT MONITORING CHART
X	SAMPLING TIME	X	ANALYSIS TIME	X	INSTRUMENT CALIBRATION
X	SAMPLE LOCATION	X	TEST METHOD	X	INSTRUMENT MAINTENANCE
				X	CERTIFICATE OF ANALYSIS

WRITTEN INSTRUCTIONS INCLUDE THE FOLLOWING:

X	SAMPLING SCHEDULES	X	CALCULATIONS	X	ANALYSIS PROCEDURES

	YES	NO	N/A
DO ALL ANALYSTS INITIAL THEIR WORK?	X		
DO BENCH SHEETS INCLUDE ALL INFORMATION NECESSARY TO DETERMINE RESULTS?	X		
IS THE DMR COMPLETE AND CORRECT? MONTH(S) REVIEWED: **See attached October 2009 DMR**	X		
ARE ALL MONITORING VALUES REQUIRED BY THE PERMIT REPORTED?	X		

GENERAL SAMPLING AND ANALYSIS SECTION

	YES	NO	N/A
ARE SAMPLE LOCATION(S) ACCORDING TO PERMIT REQUIREMENTS?	X		
ARE SAMPLE COLLECTION PROCEDURES APPROPRIATE?	X		
IS SAMPLE EQUIPMENT CONDITION ADEQUATE?	X		
IS FLOW MEASUREMENT ACCORDING TO PERMIT REQUIREMENTS?	X		
ARE COMPOSITE SAMPLES REPRESENTATIVE OF FLOW?	X		
ARE SAMPLE HOLDING TIMES AND PRESERVATION ADEQUATE?	X		
IF ANALYSIS IS PERFORMED AT ANOTHER LOCATION, ARE SHIPPING PROCEDURES ADEQUATE? LIST PARAMETERS AND NAME & ADDRESS OF LAB: TSS, TKN, E.Coli, $CBOD_5$, Total Nitrogen, Total Phosphorus Central Environmental Laboratory, 1432 Air Rail Avenue, Virginia Beach, Va.	X		

LABORATORY EQUIPMENT SECTION

	YES	NO	N/A
IS LABORATORY EQUIPMENT IN PROPER OPERATING RANGE?	X		
ARE ANNUAL THERMOMETER CALIBRATION(S) ADEQUATE?	X		
IS THE LABORATORY GRADE WATER SUPPLY ADEQUATE?			X
ARE ANALYTICAL BALANCE(S) ADEQUATE?			X

LABORATORY INSPECTION REPORT SUMMARY

FACILITY NAME:	FACILITY NO:	INSPECTION DATE:
HRSD King William WWTP	VA0088102	12/30/09
OVERALL LABORATORY EVALUATION:	**( ) Deficiencies** **(X) No Deficiencies**	
LABORATORY RECORDS		
No deficiencies noted		
GENERAL SAMPLING AND ANALYSIS		
No deficiencies noted		
LABORATORY EQUIPMENT		
All well maintained and in good condition (field parameters)		
INDIVIDUAL PARAMETERS		
No deficiencies noted		

COMMENTS

This treatment facility is relatively new. Its lab, though small is well outfitted with sufficient equipment for analyzing field and process control parameters. Justin Barker, operator on duty at time of inspection exhibited proficiency in sampling and analysis.

ANALYST:	Justin Barker	VPDES NO	VA0088201

Meter: YSI 55

Parameter: Dissolved Oxygen
Method: Membrane Electrode
Facility Elevation 80'
1/08

METHOD OF ANALYSIS:

X	18th Edition of Standard Methods – 4500-O G
	21st or Online Editions of Standard Methods – 4500-O G (01)

	DO is a method-defined analyte so modifications are not allowed. [40 CFR Part 136.6]	Y	N
1)	If samples are collected, is collection carried out with a minimum of turbulence and air bubble formation and is the sample bottle allowed to overflow several times its volume? [1.c]	X	
2)	Are meter and electrode operable and providing consistent readings? [3]	X	
3)	Is membrane in good condition without trapped air bubbles? [3.b]	X	
4)	Is correct filling solution used in electrode? [Mfr.]	X	
5)	Are water droplets shaken off the membrane prior to calibration? [Mfr.]	X	
6)	Is meter calibrated before use or at least daily? [Mfr. & Part 1020]	X	
7)	Is calibration procedure performed according to manufacturer's instructions? [Mfr.]	X	
8)	Is sample stirred during analysis? [Mfr.]	X	
9)	Is the sample analysis procedure performed according to manufacturer's instructions? [Mfr.]	X	
10)	Is meter stabilized before reading D.O.? [Mfr.]	X	
11)	Is electrode stored according to manufacturer's instructions? [Mfr.]	X	
12)	Is a duplicate sample analyzed after every 20 samples if citing 18th or 19th Edition or daily if citing 20th or 21st Edition? [Part 1020] **NOTE**: Not required for *in situ* samples.	NA	
13)	If a duplicate sample is analyzed, is the reported value for that sampling event the average concentration of the sample and the duplicate? [DEQ]	NA	
14)	If a duplicate sample is analyzed, is the relative percent difference (RPD) ≤20? [18th ed. Table 1020 I; 21st ed. DEQ]	NA	

PROBLEMS: None

COMMENT: Meter read 8.21 mg/L @ 24.6° C

ANALYST:	Justin Barker	VPDES NO	VA0088102

Meter: Beckman w/ Corning probe

Parameter: Hydrogen Ion (pH)
1/08

Method: Electrometric

METHOD OF ANALYSIS:

X	18th Edition of Standard Methods – 4500-H^+ B
	21st or Online Editions of Standard Methods – 4500-H^+ B (00)

	pH is a method-defined analyte so modifications are not allowed. [40 CFR Part 136.6]	Y	N
1)	Is a certificate of operator competence or initial demonstration of capability available for each analyst/operator performing this analysis? **NOTE**: Analyze 4 samples of known pH. May use external source of buffer (different lot/manufacturer than buffers used to calibrate meter). Recovery for each of the 4 samples must be +/- 0.1 SU of the known concentration of the sample. [SM 1020 B.1]	X	
2)	Is the electrode in good condition (no chloride precipitate, scratches, deterioration, etc.)? [2.b/c and 5.b]	X	
3)	Is electrode storage solution in accordance with manufacturer's instructions? [Mfr.]	X	
4)	Is meter calibrated on at least a daily basis using three buffers all of which are at the same temperature? [4.a] **NOTE**: Follow manufacturer's instructions.	X	
5)	After calibration, is a buffer analyzed as a check sample to verify that calibration is correct? Agreement should be within +/- 0.1 SU. [4.a]	X	
6)	Do the buffer solutions appear to be free of contamination or growths? [3.1]	X	
7)	Are buffer solutions within the listed shelf-life or have they been prepared within the last 4 weeks? [3.a]	X	
8)	Is the cap or sleeve covering the access hole on the reference electrode removed when measuring pH? [Mfr.]		
9)	For meters with ATC that also have temperature display, is the thermometer verified annually? [SM 2550 B.1] **12/9/09**	X	
10)	Is temperature of buffer solutions and samples recorded when determining pH? [4.a]	X	
11)	Is sample analyzed within 15 minutes of collections? [40 CFR Part 136]	X	
12)	Is the electrode rinsed and then blotted dry between reading solutions (Disregard if a portion of the next sample analyzed is used as the rinsing solution.)? [4.a]	X	
13)	Is the sample stirred gently at a constant speed during measurement? [4.b]	X	
14)	Does the meter hold a steady reading after reaching equilibrium? [4.b]	X	
15)	Is a duplicate sample analyzed after every 20 samples if citing 18th or 19th Edition or daily for 20th or 21st Edition? [Part 1020] **NOTE**: Not required for *in situ* samples.	NA	
16)	Is the pH of duplicate samples within 0.1SU of the original sample? [Part 1020]	NA	
17)	Is there a written procedure for which result will be reported on DMR (Sample or Duplicate) and is this procedure followed? [DEQ]	NA	

PROBLEMS: None

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
EQUIPMENT TEMPERATURE LOG/THERMOMETER VERIFICATION CHECK SHEET
1/08

FACILITY NAME:	King William WWTP	VPDES NO:	VA0088102	DATE:	December 30, 2009

EQUIPMENT	RANGE	IN RANGE		INSPECT READING °C	CHECK & LOG DAILY		CORRECT INCREMENT		ANNUAL THERMOMETER VERIFICATION				
									Is the NIST / NIST-Traceable Reference Thermometer within the manufacturer's expiration date or recertified yearly?				Y/N *Not checked
		Y	N		Y	N	Y	N	DATE CHECKED	MARKED Y	MARKED N	CORR FACTOR °C	INSPECT TEMP °C
SAMPLE REFRIGER.	1-6°C	X		0°	X		X		07/30/09	Y		0°	
AUTO SAMPLER	1-6° C												
BOD INCUBATOR	20 ± 1° C												
SOLIDS DRYING OVEN	103-105° C												
WATER BATH	44.5 ± .2° C												
INCUBATOR	35± .5° C												
AUTOCLAVE	121° C IN 30 MIN												
HOT AIR STERILIZING	170 ± 10° C												
O & G WATER BATH	70± 2° C												
REAGENT REFRIGER.	1-6° C												
pH METER	± 1° C	X							12/10/09	Y		0°	
DO METER	± 1° C	X							12/10/09	Y		0°	
THERMOMETER-OUTFALL	± 1° C												
Hg WATER BATH	95 ° C												

PROBLEMS: *NIST maintained at central laboratory. Not viewed this inspection

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
SAMPLE ANALYSIS HOLDING TIME/CONTAINER/PRESERVATION CHECK SHEET
Revised 3/08 [40 CFR, Part 136.3, Table II]

FACILITY NAME:	**HRSD King William STP**	VPDES NO	**VA0088102**	DATE:	**December 30, 2009**

HOLDING TIMES						SAMPLE CONTAINER				PRESERVATION				
PARAMETER	APPROVED	MET?		LOGGED?		ADEQ. VOLUME		APPROP. TYPE		APPROVED	MET?		CHECKED?	
		Y	N	Y	N	Y	N	Y	N		Y	N	Y	N
BOD5 & CBOD5	48 HOURS									ANALYZE 2 HRS or 6°C				
TSS	7 DAYS									6°C				
FECAL COLIFORM / *E. coli / Enterococci*	6 HRS & 2 HRS TO PROCESS									10°C (1 HOUR)+ 0.008% $Na_2S_2O_3$				
pH	15 MIN.	x		x		x		x		N/A				
CHLORINE	15 MIN.									N/A				
DISSOLVED 0_2	15 MIN./IN SITU	x		x		x		x		N/A				
TEMPERATURE	IMMERSION STAB.									N/A				
OIL & GREASE	28 DAYS									6°C + H_2SO_4/HCL pH<2				
AMMONIA	28 DAYS									6°C + H_2S0_4 pH<2 DECHLOR				
TKN	28 DAYS									6°C + H_2S0_4 pH<2 DECHLOR				
NITRATE	48 HOURS									6°C				
NITRATE+NITRITE	28 DAYS									6°C + H_2S0_4 pH<2				
NITRITE	48 HOURS									6°C				
PHOSPHATE, ORTHO	48 HOURS									FILTER, 6°C				
TOTAL PHOS.	28 DAYS									6°C+ H_2S0_4 pH<2				
METALS (except Hg)	6 MONTHS									HNO_3 pH<2				
MERCURY (CVAA)	28 DAYS									HNO_3 pH<2				

PROBLEMS: TSS, TKN, E. Coli, CBOD5, Total Nitrogen and Total Phosphorus are performed at Central Environmental Laboratory. COCs and COAs not viewed this inspection.

ATTACHMENT 5

Water Quality Criteria / Wasteload Allocation Analysis

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: HRSD - King William STP Permit No.: VA0088102

Receiving Stream: Moncuin Creek Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	19	mg/L
90% Temperature (Annual) =	23.5	deg C
90% Temperature (Wet season) =	18.4	deg C
90% Maximum pH =	6.6	SU
10% Maximum pH =	5.8	SU
Tier Designation (1 or 2) =	1	
Public Water Supply (PWS) Y/N? =	n	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows

1Q10 (Annual) =	0.14	MGD
7Q10 (Annual) =	0.23	MGD
30Q10 (Annual) =	0.49	MGD
1Q10 (Wet season) =	2.4	MGD
30Q10 (Wet season)	5.1	MGD
30Q5 =	1	MGD
Harmonic Mean =		MGD

Mixing Information

Annual - 1Q10 Mix =	7.93	%
- 7Q10 Mix =	100	%
- 30Q10 Mix =	100	%
Wet Season - 1Q10 Mix =	65.99	%
- 30Q10 Mix =	100	%

Effluent Information

Mean Hardness (as CaCO3) =	103.9	mg/L
90% Temp (Annual) =	28	deg C
90% Temp (Wet season) =	15	deg C
90% Maximum pH =	7.7	SU
10% Maximum pH =	6.6	SU
Discharge Flow =	0.1	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.0E+02	--	--	--	--	--	--	--	--	--	--	na	1.0E+02
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	2.5E+00	--	--	--	--	--	--	--	--	--	--	na	2.5E+00
Aldrin[C]	0	3.0E+00	--	na	5.0E-04	3.3E+00	--	na	5.0E-04	--	--	--	--	--	--	--	--	3.3E+00	--	na	5.0E-04
Ammonia-N (mg/l) (Yearly)	0	2.41E+01	3.46E+00	na	--	2.67E+01	2.04E+01	na	--	--	--	--	--	--	--	--	--	2.67E+01	2.04E+01	na	--
Ammonia-N (mg/l) (High Flow)	0	4.63E+01	5.13E+00	na	--	7.80E+02	2.67E+02	na	--	--	--	--	--	--	--	--	--	7.80E+02	2.67E+02	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	4.4E+05	--	--	--	--	--	--	--	--	--	--	na	4.4E+05
Antimony	0	--	--	na	6.4E+02	--	--	na	7.0E+03	--	--	--	--	--	--	--	--	--	--	na	7.0E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	3.8E+02	5.0E+02	na	--	--	--	--	--	--	--	--	--	3.8E+02	5.0E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene[C]	0	--	--	na	5.1E+02	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	--	--	na	5.1E+02
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	2.0E-03	--	--	--	--	--	--	--	--	--	--	na	2.0E-03
Benzo (a) anthracene[C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (b) fluoranthene[C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (k) fluoranthene[C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (a) pyrene[C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Bis2-Chloroethyl Ether[C]	0	--	--	na	5.3E+00	--	--	na	5.3E+00	--	--	--	--	--	--	--	--	--	--	na	5.3E+00
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	7.2E+05	--	--	--	--	--	--	--	--	--	--	na	7.2E+05
Bis 2-Ethylhexyl Phthalate[C]	0	--	--	na	2.2E+01	--	--	na	2.2E+01	--	--	--	--	--	--	--	--	--	--	na	2.2E+01
Bromoform[C]	0	--	--	na	1.4E+03	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04
Cadmium	0	3.7E+00	6.0E-01	na	--	4.1E+00	2.0E+00	na	--	--	--	--	--	--	--	--	--	4.1E+00	2.0E+00	na	--
Carbon Tetrachloride[C]	0	--	--	na	1.6E+01	--	--	na	1.6E+01	--	--	--	--	--	--	--	--	--	--	na	1.6E+01
Chlordane[C]	0	2.4E+00	4.3E-03	na	8.1E-03	2.7E+00	1.4E-02	na	8.1E-03	--	--	--	--	--	--	--	--	2.7E+00	1.4E-02	na	8.1E-03
Chloride	0	8.6E+05	2.3E+05	na	--	9.6E+05	7.6E+05	na	--	--	--	--	--	--	--	--	--	9.6E+05	7.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	2.1E+01	3.6E+01	na	--	--	--	--	--	--	--	--	--	2.1E+01	3.6E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	--	--	na	1.8E+04

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	--	--	na	**1.3E+02**
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.2E+05	--	--	--	--	--	--	--	--	--	--	na	**1.2E+05**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	--	--	na	**1.8E+04**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	**1.7E+03**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	9.2E-02	1.4E-01	na	--	--	--	--	--	--	--	--	--	**9.2E-02**	**1.4E-01**	na	--
Chromium III	0	5.5E+02	3.8E+01	na	--	6.1E+02	1.3E+02	na	--	--	--	--	--	--	--	--	--	**6.1E+02**	**1.3E+02**	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.8E+01	3.6E+01	na	--	--	--	--	--	--	--	--	--	**1.8E+01**	**3.6E+01**	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene[C]	0	--	--	na	1.8E-02	--	--	na	1.8E-02	--	--	--	--	--	--	--	--	--	--	na	**1.8E-02**
Copper	0	1.3E+01	4.5E+00	na	--	1.4E+01	1.5E+01	na	--	--	--	--	--	--	--	--	--	**1.4E+01**	**1.5E+01**	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.4E+01	1.7E+01	na	1.8E+05	--	--	--	--	--	--	--	--	**2.4E+01**	**1.7E+01**	na	**1.8E+05**
DDD[C]	0	--	--	na	3.1E-03	--	--	na	3.1E-03	--	--	--	--	--	--	--	--	--	--	na	**3.1E-03**
DDE[C]	0	--	--	na	2.2E-03	--	--	na	2.2E-03	--	--	--	--	--	--	--	--	--	--	na	**2.2E-03**
DDT[C]	0	1.1E+00	1.0E-03	na	2.2E-03	1.2E+00	3.3E-03	na	2.2E-03	--	--	--	--	--	--	--	--	**1.2E+00**	**3.3E-03**	na	**2.2E-03**
Demeton	0	--	1.0E-01	na	--	--	3.3E-01	na	--	--	--	--	--	--	--	--	--	--	**3.3E-01**	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.9E-01	5.6E-01	na	--	--	--	--	--	--	--	--	--	**1.9E-01**	**5.6E-01**	na	--
Dibenz(a,h)anthracene[C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	**1.8E-01**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	**1.4E+04**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	**1.1E+04**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	--	--	na	**2.1E+03**
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	2.8E-01	--	--	--	--	--	--	--	--	--	--	na	**2.8E-01**
Dichlorobromomethane[C]	0	--	--	na	1.7E+02	--	--	na	1.7E+02	--	--	--	--	--	--	--	--	--	--	na	**1.7E+02**
1,2-Dichloroethane[C]	0	--	--	na	3.7E+02	--	--	na	3.7E+02	--	--	--	--	--	--	--	--	--	--	na	**3.7E+02**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	7.8E+04	--	--	--	--	--	--	--	--	--	--	na	**7.8E+04**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	na	**1.1E+05**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	**3.2E+03**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	na	**1.5E+02**
1,3-Dichloropropene[C]	0	--	--	na	2.1E+02	--	--	na	2.1E+02	--	--	--	--	--	--	--	--	--	--	na	**2.1E+02**
Dieldrin[C]	0	2.4E-01	5.6E-02	na	5.4E-04	2.7E-01	1.8E-01	na	5.4E-04	--	--	--	--	--	--	--	--	**2.7E-01**	**1.8E-01**	na	**5.4E-04**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	4.8E+05	--	--	--	--	--	--	--	--	--	--	na	**4.8E+05**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	9.4E+03	--	--	--	--	--	--	--	--	--	--	na	**9.4E+03**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.2E+07	--	--	--	--	--	--	--	--	--	--	na	**1.2E+07**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	5.0E+04	--	--	--	--	--	--	--	--	--	--	na	**5.0E+04**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	5.8E+04	--	--	--	--	--	--	--	--	--	--	na	**5.8E+04**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	3.1E+03	--	--	--	--	--	--	--	--	--	--	na	**3.1E+03**
2,4-Dinitrotoluene[C]	0	--	--	na	3.4E+01	--	--	na	3.4E+01	--	--	--	--	--	--	--	--	--	--	na	**3.4E+01**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	5.6E-07	--	--	--	--	--	--	--	--	--	--	na	**5.6E-07**
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	2.0E+00	--	--	--	--	--	--	--	--	--	--	na	**2.0E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.4E-01	1.8E-01	na	9.8E+02	--	--	--	--	--	--	--	--	**2.4E-01**	**1.8E-01**	na	**9.8E+02**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.4E-01	1.8E-01	na	9.8E+02	--	--	--	--	--	--	--	--	**2.4E-01**	**1.8E-01**	na	**9.8E+02**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.4E-01	1.8E-01	--	--	--	--	--	--	--	--	--	--	**2.4E-01**	**1.8E-01**	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	9.8E+02	--	--	--	--	--	--	--	--	--	--	na	**9.8E+02**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	9.6E-02	1.2E-01	na	6.6E-01	--	--	--	--	--	--	--	--	**9.6E-02**	**1.2E-01**	na	**6.6E-01**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	3.3E+00	--	--	--	--	--	--	--	--	--	--	na	**3.3E+00**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	2.3E+04	--	--	--	--	--	--	--	--	--	--	na	**2.3E+04**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	--	--	na	**1.5E+03**
Fluorene	0	--	--	na	5.3E+03	--	--	na	5.8E+04	--	--	--	--	--	--	--	--	--	--	na	**5.8E+04**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	**--**
Guthion	0	--	1.0E-02	na	--	--	3.3E-02	na	--	--	--	--	--	--	--	--	--	--	**3.3E-02**	na	**--**
Heptachlor [c]	0	5.2E-01	3.8E-03	na	7.9E-04	5.8E-01	1.3E-02	na	7.9E-04	--	--	--	--	--	--	--	--	**5.8E-01**	**1.3E-02**	na	**7.9E-04**
Heptachlor Epoxide [c]	0	5.2E-01	3.8E-03	na	3.9E-04	5.8E-01	1.3E-02	na	3.9E-04	--	--	--	--	--	--	--	--	**5.8E-01**	**1.3E-02**	na	**3.9E-04**
Hexachlorobenzene [c]	0	--	--	na	2.9E-03	--	--	na	2.9E-03	--	--	--	--	--	--	--	--	--	--	na	**2.9E-03**
Hexachlorobutadiene [c]	0	--	--	na	1.8E+02	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	**1.8E+02**
Hexachlorocyclohexane Alpha-BHC [c]	0	--	--	na	4.9E-02	--	--	na	4.9E-02	--	--	--	--	--	--	--	--	--	--	na	**4.9E-02**
Hexachlorocyclohexane Beta-BHC [c]	0	--	--	na	1.7E-01	--	--	na	1.7E-01	--	--	--	--	--	--	--	--	--	--	na	**1.7E-01**
Hexachlorocyclohexane Gamma-BHC [c] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.1E+00	--	na	1.8E+00	--	--	--	--	--	--	--	--	**1.1E+00**	--	na	**1.8E+00**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	**1.2E+04**
Hexachloroethane [c]	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	--	--	na	**3.3E+01**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	6.6E+00	na	--	--	--	--	--	--	--	--	--	--	**6.6E+00**	na	**--**
Indeno (1,2,3-cd) pyrene [c]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	**1.8E-01**
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	**--**
Isophorone [c]	0	--	--	na	9.6E+03	--	--	na	9.6E+03	--	--	--	--	--	--	--	--	--	--	na	**9.6E+03**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	**0.0E+00**	na	**--**
Lead	0	1.1E+02	4.9E+00	na	--	1.2E+02	1.6E+01	na	--	--	--	--	--	--	--	--	--	**1.2E+02**	**1.6E+01**	na	**--**
Malathion	0	--	1.0E-01	na	--	--	3.3E-01	na	--	--	--	--	--	--	--	--	--	--	**3.3E-01**	na	**--**
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	**--**
Mercury	0	1.4E+00	7.7E-01	--	--	1.6E+00	2.5E+00	--	--	--	--	--	--	--	--	--	--	**1.6E+00**	**2.5E+00**	--	**--**
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	**1.7E+04**
Methylene Chloride [c]	0	--	--	na	5.9E+03	--	--	na	5.9E+03	--	--	--	--	--	--	--	--	--	--	na	**5.9E+03**
Methoxychlor	0	--	3.0E-02	na	--	--	9.9E-02	na	--	--	--	--	--	--	--	--	--	--	**9.9E-02**	na	**--**
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	**0.0E+00**	na	**--**
Nickel	0	1.8E+02	1.0E+01	na	4.6E+03	1.9E+02	3.4E+01	na	5.1E+04	--	--	--	--	--	--	--	--	**1.9E+02**	**3.4E+01**	na	**5.1E+04**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	**--**
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	7.6E+03	--	--	--	--	--	--	--	--	--	--	na	**7.6E+03**
N-Nitrosodimethylamine [c]	0	--	--	na	3.0E+01	--	--	na	3.0E+01	--	--	--	--	--	--	--	--	--	--	na	**3.0E+01**
N-Nitrosodiphenylamine [c]	0	--	--	na	6.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	**6.0E+01**
N-Nitrosodi-n-propylamine [c]	0	--	--	na	5.1E+00	--	--	na	5.1E+00	--	--	--	--	--	--	--	--	--	--	na	**5.1E+00**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	3.1E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	**3.1E+01**	**2.2E+01**	na	**--**
Parathion	0	6.5E-02	1.3E-02	na	--	7.2E-02	4.3E-02	na	--	--	--	--	--	--	--	--	--	**7.2E-02**	**4.3E-02**	na	**--**
PCB Total [c]	0	--	1.4E-02	na	6.4E-04	--	4.6E-02	na	6.4E-04	--	--	--	--	--	--	--	--	--	**4.6E-02**	na	**6.4E-04**
Pentachlorophenol [c]	0	4.8E+00	2.3E+00	na	3.0E+01	5.4E+00	7.5E+00	na	3.0E+01	--	--	--	--	--	--	--	--	**5.4E+00**	**7.5E+00**	na	**3.0E+01**
Phenol	0	--	--	na	8.6E+05	--	--	na	9.5E+06	--	--	--	--	--	--	--	--	--	--	na	**9.5E+06**
Pyrene	0	--	--	na	4.0E+03	--	--	na	4.4E+04	--	--	--	--	--	--	--	--	--	--	na	**4.4E+04**
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	**--**
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	**4.4E+01**
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	**--**
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	**--**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.2E+01	1.7E+01	na	4.6E+04	--	--	--	--	--	--	--	--	**2.2E+01**	**1.7E+01**	**na**	**4.6E+04**
Silver	0	3.2E+00	--	na	--	3.5E+00	--	na	--	--	--	--	--	--	--	--	--	**3.5E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[c]	0	--	--	na	4.0E+01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+01**
Tetrachloroethylene[c]	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.3E+01**
Thallium	0	--	--	na	4.7E-01	--	--	na	5.2E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.2E+00**
Toluene	0	--	--	na	6.0E+03	--	--	na	6.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.6E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene[c]	0	7.3E-01	2.0E-04	na	2.8E-03	8.1E-01	6.6E-04	na	2.8E-03	--	--	--	--	--	--	--	--	**8.1E-01**	**6.6E-04**	**na**	**2.8E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	5.1E-01	2.4E-01	na	--	--	--	--	--	--	--	--	--	**5.1E-01**	**2.4E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	7.7E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.7E+02**
1,1,2-Trichloroethane[c]	0	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+02**
Trichloroethylene[c]	0	--	--	na	3.0E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E+02**
2,4,6-Trichlorophenol[c]	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.4E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[c]	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.4E+01**
Zinc	0	1.1E+02	6.0E+01	na	2.6E+04	1.3E+02	2.0E+02	na	2.9E+05	--	--	--	--	--	--	--	--	**1.3E+02**	**2.0E+02**	**na**	**2.9E+05**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	7.0E+03
Arsenic	1.5E+02
Barium	na
Cadmium	1.2E+00
Chromium III	7.6E+01
Chromium VI	7.1E+00
Copper	5.7E+00
Iron	na
Lead	9.6E+00
Manganese	na
Mercury	6.2E-01
Nickel	2.0E+01
Selenium	8.9E+00
Silver	1.4E+00
Zinc	5.0E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

ATTACHMENT 6

Ambient hardness, pH and temperature Data
June 1995 – June 2009

					00900	
				Container	HARDNESS, TOTAL (MG/L AS CACO3)	
Sta Id	Collection Date Time	Depth Desc	Depth	Id Desc	Value	Com Code
8-MNQ004.19	06/19/1996 13:00	S	0.3	R	26	
8-MNQ004.19	09/18/1996 12:39	S	0.3	R	20	
8-MNQ004.19	12/11/1996 12:30	S	0.3	R	22	
8-MNQ004.19	03/26/1997 13:33	S	0.3	R	21.1	
8-MNQ004.19	06/16/1997 14:34	S	0.3	R	22	
8-MNQ004.19	07/08/1997 11:15	S	0.3	R	22.8	
8-MNQ004.19	09/15/1997 12:22	S	0.3	R	22	
8-MNQ004.19	11/03/1997 14:43	S	0.3	R	11.9	
8-MNQ004.19	01/05/1998 12:11	S	0.3	R	15.1	
8-MNQ004.19	03/11/1998 11:45	S	0.3	R	20	
8-MNQ004.19	05/06/1998 11:30	S	0.3	R	17.5	
8-MNQ004.19	07/07/1998 11:55	S	0.3	R	14	
8-MNQ004.19	09/21/1998 12:00	S	0.3	R	13.5	
8-MNQ004.19	11/23/1998 11:05	S	0.3	R	58	
8-MNQ004.19	01/14/1999 12:22	S	0.3	R	18	
8-MNQ004.19	03/08/1999 10:25	S	0.3	R	20	
8-MNQ004.19	05/24/1999 16:15	S	0.3	R	34	
8-MNQ004.19	09/15/1999 11:15	S	0.3	R	15.5	
8-MNQ004.19	03/15/2000 12:30	S	0.3	R	14	
8-MNQ004.19	05/25/2000 12:00	S	0.3	R	17	
8-MNQ004.19	07/17/2000 11:35	S	0.3	R	11	
8-MNQ004.19	09/27/2000 10:35	S	0.3	R	11.2	
8-MNQ004.19	11/02/2000 10:35	S	0.3	R	12.3	
8-MNQ004.19	03/27/2001 13:11	S	0.3	R	8.4	
8-MNQ004.19	08/28/2003 12:15	S	0.3	R	19.7	
8-MNQ004.19	10/23/2003 13:20	S	0.3	R	25	
8-MNQ004.19	12/29/2003 13:50	S	0.3	R	16	
8-MNQ004.19	02/24/2004 14:45	S	0.3	R	11	
8-MNQ004.19	04/21/2004 14:22	S	0.3	S1	20.1	
8-MNQ004.19	06/09/2004 11:45	S	0.3	R	18	
8-MNQ004.19	07/22/2004 11:40	S	0.3	R	19	
8-MNQ004.19	08/30/2004 12:10	S	0.3	R	20	
8-MNQ004.19	11/22/2004 14:00	S	0.3	R	18	
8-MNQ004.19	01/18/2005 13:20	S	0.3	R	20	
8-MNQ004.19	03/30/2005 13:00	S	0.3	R	20	
Average					**19**	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler
8-MNQ004.19	6/30/1995	S	0.3	24.37	6.06	6.14	
8-MNQ004.19	6/19/1996	S	0.3	26.42	6.31	6.04	
8-MNQ004.19	9/18/1996	S	0.3	19.98	6.11	7.85	
8-MNQ004.19	12/11/1996	S	0.3	5.06	6.09	12.04	
8-MNQ004.19	3/26/1997	S	0.3	13.69	6.29	9.95	
8-MNQ004.19	6/16/1997	S	0.3	20.75	6.4	9.47	
8-MNQ004.19	7/8/1997	S	0.3	22.8	6.47	7.06	
8-MNQ004.19	9/15/1997	S	0.3	20.14	6.25	7.29	
8-MNQ004.19	11/3/1997	S	0.3	12.98	5.92	8.52	
8-MNQ004.19	1/5/1998	S	0.3	6.14	5.96	12.1	
8-MNQ004.19	3/11/1998	S	0.3	5.84	5.8	12.2	
8-MNQ004.19	5/6/1998	S	0.3	17.21	6.22	8.26	
8-MNQ004.19	7/7/1998	S	0.3	22.7	6.24	7.32	
8-MNQ004.19	9/21/1998	S	0.3	22.2	6.07	5.68	
8-MNQ004.19	11/23/1998	S	0.3	5.17	5.64	11.12	
8-MNQ004.19	1/14/1999	S	0.3	5	5.96	11.68	
8-MNQ004.19	3/8/1999	S	0.3	3.2	5.92	13.22	
8-MNQ004.19	5/24/1999	S	0.3	22.32	6.26	6.78	
8-MNQ004.19	7/22/1999	S	0.3	25.4	6.35	5.79	
8-MNQ004.19	9/15/1999	S	0.3	20.51	6.22	6.6	
8-MNQ004.19	11/4/1999	S	0.3	9.09	5.62	8.29	
8-MNQ004.19	3/15/2000	S	0.3	11.8	6.09	11.2	
8-MNQ004.19	5/25/2000	S	0.3	21.58	6.35	6.85	
8-MNQ004.19	7/17/2000	S	0.3	21.97	6.07	6.74	
8-MNQ004.19	9/27/2000	S	0.3	14.19	5.82	8.4	
8-MNQ004.19	11/2/2000	S	0.3	7.7	6.49	9.42	
8-MNQ004.19	3/27/2001	S	0.3	8.31	6.62	12.4	
8-MNQ004.19	7/8/2003	S	0.3	23.88	6.4	7.02	
8-MNQ004.19	8/12/2003	S	0.3	23.08	6.48	7.67	
8-MNQ004.19	8/28/2003	S	0.3	23.91	6.43	7.13	
8-MNQ004.19	9/9/2003	S	0.3	20.09	6.45	8.04	
8-MNQ004.19	10/7/2003	S	0.3	15.13	6.27	9.25	
8-MNQ004.19	10/23/2003	S	0.3	11.97	5.98	8.75	
8-MNQ004.19	11/4/2003	S	0.3	15.16	6.14	8.32	
8-MNQ004.19	12/2/2003	S	0.3	5.14	6.59	12.01	
8-MNQ004.19	12/29/2003	S	0.3	3.07	6.39	12.79	
8-MNQ004.19	1/6/2004	S	0.3	8.04	6.06	10.84	
8-MNQ004.19	2/9/2004	S	0.3	2.4	6.1	13.38	
8-MNQ004.19	2/24/2004	S	0.3	5.97	6.11	11.97	
8-MNQ004.19	3/9/2004	S	0.3	6.82	6.41	11.6	
8-MNQ004.19	4/6/2004	S	0.3	7.84	6.36	12.19	
8-MNQ004.19	4/21/2004	S	0.3	20.32	6.4	8.42	8.16
8-MNQ004.19	5/4/2004	S	0.3	12.61	5.98	9.54	
8-MNQ004.19	6/1/2004	S	0.3	21.25	6.34	7.44	
8-MNQ004.19	6/9/2004	S	0.3	22.37	6.44	7.37	
8-MNQ004.19	7/22/2004	S	0.3	24.32	6.28	6.82	
8-MNQ004.19	7/28/2004	S	0.3	23.3	6.67	6.2	
8-MNQ004.19	8/3/2004	S	0.3	23.57	5.53	6.25	
8-MNQ004.19	8/30/2004	S	0.3	23.34	6.64	6.95	
8-MNQ004.19	9/7/2004	S	0.3	21.75	6.11	7.21	
8-MNQ004.19	10/5/2004	S	0.3	16.86	5.66	9.22	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler
8-MNQ004.19	11/2/2004	S	0.3	15.91	5.94	8.73	
8-MNQ004.19	11/22/2004	S	0.3	13.14	5.85	9.3	
8-MNQ004.19	12/10/2004	S	0.3	10.62	6.05	9.3	
8-MNQ004.19	1/6/2005	S	0.3	10.13	6.63	10.34	
8-MNQ004.19	1/18/2005	S	0.3	0.39	6.18	15.31	
8-MNQ004.19	2/1/2005	S	0.3	2.17	6.71	13.11	
8-MNQ004.19	3/8/2005	S	0.3	8.6	6.28	10.92	
8-MNQ004.19	3/30/2005	S	0.3	11.22	6.63	11.12	
8-MNQ004.19	4/5/2005	S	0.3	10.71	6.14	10.39	
8-MNQ004.19	7/21/2008	S	0.3	26.4	6.6	5.7	
8-MNQ004.19	8/25/2008	S	0.3	22.2	6.9	5.2	
8-MNQ004.19	9/4/2008	S	0.3	21.8	6.5	6.3	
8-MNQ004.19	10/22/2008	S	0.3	9.9	6.6	9.6	
8-MNQ004.19	11/6/2008	S	0.3	15	6.4	7.4	
8-MNQ004.19	12/3/2008	S	0.3	3.3	6.6	13.1	
8-MNQ004.19	1/8/2009	S	0.3	4.8	5.8	11.7	
8-MNQ004.19	2/3/2009	S	0.3	4.3	5.6	12.1	
8-MNQ004.19	3/5/2009	S	0.3	2.6	6.8	13.7	
8-MNQ004.19	4/2/2009	S	0.3	13.6	6.3	9.8	
8-MNQ004.19	5/7/2009	S	0.3	17.5	5.9	7.6	
8-MNQ004.19	6/3/2009	S	0.3	22.3	6.6	7.2	
90th Percentile				**23.5**	**6.6**		
10th Percentile				**4.4**	**5.8**		
90th Percentile	**wet season**			**18.4**			

ATTACHMENT 7

Effluent Data
April 2010 – July 2014

DMR QA/QC

Permit #:VA0088102	Facility:HRSD King William County Sewage Treatment Plant

Rec'd	Parameter Description	QTY AVG	Lim Avg	QTY MAX	Lim Max	CONC MIN	Lim Min	CONC AVG	Lim Avg	CONC MAX	Lim Max
11-May-2010	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
11-Jun-2010	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Jul-2010	CBOD5	68	4900	340	7400	NULL	*********	1	13	3	20
11-Aug-2010	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Sep-2010	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Oct-2010	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
12-Nov-2010	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Dec-2010	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
11-Jan-2011	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
10-Feb-2011	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
14-Mar-2011	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Apr-2011	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
11-May-2011	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Jun-2011	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
12-Jul-2011	CBOD5	24	4900	110	7400	NULL	*********	0	13	1	20
11-Aug-2011	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
14-Sep-2011	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
12-Oct-2011	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
14-Nov-2011	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Dec-2011	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
10-Jan-2012	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Feb-2012	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Mar-2012	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
11-Apr-2012	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
11-May-2012	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
12-Jun-2012	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
11-Jul-2012	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
11-Aug-2012	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Aug-2012	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
11-Oct-2012	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Nov-2012	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
11-Dec-2012	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
14-Jan-2013	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
12-Feb-2013	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
12-Mar-2013	CBOD5	130	4900	530	7400	NULL	*********	1	13	5	20
15-Apr-2013	CBOD5	150	4900	590	7400	NULL	*********	1	13	4	20
13-May-2013	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20

13-Jun-2013	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
12-Jul-2013	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
12-Aug-2013	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
09-Sep-2013	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
11-Oct-2013	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Nov-2013	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
13-Dec-2013	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
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12-Feb-2014	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
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14-Apr-2014	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
12-May-2014	CBOD5	110	4900	560	7400	NULL	*********	1	13	4	20
12-Jun-2014	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
11-Jul-2014	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
12-Aug-2014	CBOD5	<QL	4900	<QL	7400	NULL	*********	<QL	13	<QL	20
11-May-2010	DO	NULL	*********	NULL	*********	7.3	5.0	NULL	*********	NULL	*********
11-Jun-2010	DO	NULL	*********	NULL	*********	7.0	5.0	NULL	*********	NULL	*********
13-Jul-2010	DO	NULL	*********	NULL	*********	6.2	5.0	NULL	*********	NULL	*********
11-Aug-2010	DO	NULL	*********	NULL	*********	6.1	5.0	NULL	*********	NULL	*********
13-Sep-2010	DO	NULL	*********	NULL	*********	6.1	5.0	NULL	*********	NULL	*********
13-Oct-2010	DO	NULL	*********	NULL	*********	6.3	5.0	NULL	*********	NULL	*********
12-Nov-2010	DO	NULL	*********	NULL	*********	6.7	5.0	NULL	*********	NULL	*********
13-Dec-2010	DO	NULL	*********	NULL	*********	7.2	5.0	NULL	*********	NULL	*********
11-Jan-2011	DO	NULL	*********	NULL	*********	8.4	5.0	NULL	*********	NULL	*********
10-Feb-2011	DO	NULL	*********	NULL	*********	9.1	5.0	NULL	*********	NULL	*********
14-Mar-2011	DO	NULL	*********	NULL	*********	8.1	5.0	NULL	*********	NULL	*********
13-Apr-2011	DO	NULL	*********	NULL	*********	8.4	5.0	NULL	*********	NULL	*********
11-May-2011	DO	NULL	*********	NULL	*********	7.3	5.0	NULL	*********	NULL	*********
13-Jun-2011	DO	NULL	*********	NULL	*********	6.9	5.0	NULL	*********	NULL	*********
12-Jul-2011	DO	NULL	*********	NULL	*********	6.4	5.0	NULL	*********	NULL	*********
11-Aug-2011	DO	NULL	*********	NULL	*********	5.6	5.0	NULL	*********	NULL	*********
14-Sep-2011	DO	NULL	*********	NULL	*********	5.6	5.0	NULL	*********	NULL	*********
12-Oct-2011	DO	NULL	*********	NULL	*********	5.7	5.0	NULL	*********	NULL	*********
14-Nov-2011	DO	NULL	*********	NULL	*********	6.5	5.0	NULL	*********	NULL	*********
13-Dec-2011	DO	NULL	*********	NULL	*********	7.5	5.0	NULL	*********	NULL	*********
10-Jan-2012	DO	NULL	*********	NULL	*********	8.4	5.0	NULL	*********	NULL	*********
13-Feb-2012	DO	NULL	*********	NULL	*********	8.0	5.0	NULL	*********	NULL	*********
13-Mar-2012	DO	NULL	*********	NULL	*********	9.2	5.0	NULL	*********	NULL	*********
11-Apr-2012	DO	NULL	*********	NULL	*********	7.2	5.0	NULL	*********	NULL	*********
11-May-2012	DO	NULL	*********	NULL	*********	6.6	5.0	NULL	*********	NULL	*********
12-Jun-2012	DO	NULL	*********	NULL	*********	6.5	5.0	NULL	*********	NULL	*********
11-Jul-2012	DO	NULL	*********	NULL	*********	6.3	5.0	NULL	*********	NULL	*********
11-Aug-2012	DO	NULL	*********	NULL	*********	5.7	5.0	NULL	*********	NULL	*********

13-Aug-2012	DO	NULL	*********	NULL	*********	5.6	5.0	NULL	*********	NULL	*********
11-Oct-2012	DO	NULL	*********	NULL	*********	5.9	5.0	NULL	*********	NULL	*********
13-Nov-2012	DO	NULL	*********	NULL	*********	6.7	5.0	NULL	*********	NULL	*********
11-Dec-2012	DO	NULL	*********	NULL	*********	7.5	5.0	NULL	*********	NULL	*********
14-Jan-2013	DO	NULL	*********	NULL	*********	7.5	5.0	NULL	*********	NULL	*********
12-Feb-2013	DO	NULL	*********	NULL	*********	8.3	5.0	NULL	*********	NULL	*********
12-Mar-2013	DO	NULL	*********	NULL	*********	9.1	5.0	NULL	*********	NULL	*********
15-Apr-2013	DO	NULL	*********	NULL	*********	7.8	5.0	NULL	*********	NULL	*********
13-May-2013	DO	NULL	*********	NULL	*********	7.5	5.0	NULL	*********	NULL	*********
13-Jun-2013	DO	NULL	*********	NULL	*********	6.6	5.0	NULL	*********	NULL	*********
12-Jul-2013	DO	NULL	*********	NULL	*********	5.5	5.0	NULL	*********	NULL	*********
12-Aug-2013	DO	NULL	*********	NULL	*********	5.9	5.0	NULL	*********	NULL	*********
09-Sep-2013	DO	NULL	*********	NULL	*********	6.0	5.0	NULL	*********	NULL	*********
11-Oct-2013	DO	NULL	*********	NULL	*********	5.8	5.0	NULL	*********	NULL	*********
13-Nov-2013	DO	NULL	*********	NULL	*********	7.0	5.0	NULL	*********	NULL	*********
13-Dec-2013	DO	NULL	*********	NULL	*********	7.9	5.0	NULL	*********	NULL	*********
13-Jan-2014	DO	NULL	*********	NULL	*********	6.0	5.0	NULL	*********	NULL	*********
12-Feb-2014	DO	NULL	*********	NULL	*********	7.5	5.0	NULL	*********	NULL	*********
18-Mar-2014	DO	NULL	*********	NULL	*********	7.8	5.0	NULL	*********	NULL	*********
14-Apr-2014	DO	NULL	*********	NULL	*********	7.2	5.0	NULL	*********	NULL	*********
12-May-2014	DO	NULL	*********	NULL	*********	7.4	5.0	NULL	*********	NULL	*********
12-Jun-2014	DO	NULL	*********	NULL	*********	7.2	5.0	NULL	*********	NULL	*********
11-Jul-2014	DO	NULL	*********	NULL	*********	5.5	5.0	NULL	*********	NULL	*********
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10-Feb-2011	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
14-Mar-2011	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
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13-Jun-2011	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
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11-Aug-2011	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
14-Sep-2011	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
12-Oct-2011	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
14-Nov-2011	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********

13-Dec-2011	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
10-Jan-2012	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
13-Feb-2012	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
13-Mar-2012	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
11-Apr-2012	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
11-May-2012	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
12-Jun-2012	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
11-Jul-2012	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
11-Aug-2012	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
13-Aug-2012	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
11-Oct-2012	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
13-Nov-2012	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
11-Dec-2012	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
14-Jan-2013	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
12-Feb-2013	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
12-Mar-2013	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
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13-Jun-2013	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
12-Jul-2013	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
12-Aug-2013	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
09-Sep-2013	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
11-Oct-2013	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
13-Nov-2013	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
13-Dec-2013	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
13-Jan-2014	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
12-Feb-2014	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
18-Mar-2014	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
14-Apr-2014	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
12-May-2014	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
12-Jun-2014	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
11-Jul-2014	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
12-Aug-2014	E.COLI	NULL	*********	NULL	*********	NULL	*********	<QL	126	NULL	*********
11-May-2010	FLOW	0.025	0.100	0.035	NL	NULL	*********	NULL	*********	NULL	*********
11-Jun-2010	FLOW	0.026	0.100	0.042	NL	NULL	*********	NULL	*********	NULL	*********
13-Jul-2010	FLOW	0.025	0.100	0.035	NL	NULL	*********	NULL	*********	NULL	*********
11-Aug-2010	FLOW	0.025	0.100	0.042	NL	NULL	*********	NULL	*********	NULL	*********
13-Sep-2010	FLOW	0.023	0.100	0.037	NL	NULL	*********	NULL	*********	NULL	*********
13-Oct-2010	FLOW	0.024	0.100	0.056	NL	NULL	*********	NULL	*********	NULL	*********
12-Nov-2010	FLOW	0.028	0.100	0.040	NL	NULL	*********	NULL	*********	NULL	*********
13-Dec-2010	FLOW	0.026	0.100	0.033	NL	NULL	*********	NULL	*********	NULL	*********
11-Jan-2011	FLOW	0.023	0.100	0.032	NL	NULL	*********	NULL	*********	NULL	*********
10-Feb-2011	FLOW	0.022	0.100	0.028	NL	NULL	*********	NULL	*********	NULL	*********

14-Mar-2011	FLOW	0.026	0.100	0.032	NL	NULL	*********	NULL	*********	NULL	*********
13-Apr-2011	FLOW	0.027	0.100	0.041	NL	NULL	*********	NULL	*********	NULL	*********
11-May-2011	FLOW	0.025	0.100	0.034	NL	NULL	*********	NULL	*********	NULL	*********
13-Jun-2011	FLOW	0.028	0.100	0.035	NL	NULL	*********	NULL	*********	NULL	*********
12-Jul-2011	FLOW	0.027	0.100	NULL	NL	NULL	*********	NULL	*********	NULL	*********
11-Aug-2011	FLOW	0.026	0.100	0.040	NL	NULL	*********	NULL	*********	NULL	*********
14-Sep-2011	FLOW	0.032	0.100	0.044	NL	NULL	*********	NULL	*********	NULL	*********
12-Oct-2011	FLOW	0.037	0.100	0.067	NL	NULL	*********	NULL	*********	NULL	*********
14-Nov-2011	FLOW	0.032	0.100	0.042	NL	NULL	*********	NULL	*********	NULL	*********
13-Dec-2011	FLOW	0.028	0.100	0.042	NL	NULL	*********	NULL	*********	NULL	*********
10-Jan-2012	FLOW	0.027	0.100	0.038	NL	NULL	*********	NULL	*********	NULL	*********
13-Feb-2012	FLOW	0.027	0.100	0.035	NL	NULL	*********	NULL	*********	NULL	*********
13-Mar-2012	FLOW	0.027	0.100	0.041	NL	NULL	*********	NULL	*********	NULL	*********
11-Apr-2012	FLOW	0.032	0.100	0.044	NL	NULL	*********	NULL	*********	NULL	*********
11-May-2012	FLOW	0.028	0.100	0.042	NL	NULL	*********	NULL	*********	NULL	*********
12-Jun-2012	FLOW	0.032	0.100	0.042	NL	NULL	*********	NULL	*********	NULL	*********
11-Jul-2012	FLOW	0.031	0.100	0.044	NL	NULL	*********	NULL	*********	NULL	*********
11-Aug-2012	FLOW	0.029	0.100	0.041	NL	NULL	*********	NULL	*********	NULL	*********
13-Aug-2012	FLOW	0.029	0.100	0.039	NL	NULL	*********	NULL	*********	NULL	*********
11-Oct-2012	FLOW	0.028	0.100	0.036	NL	NULL	*********	NULL	*********	NULL	*********
13-Nov-2012	FLOW	0.028	0.100	0.040	NL	NULL	*********	NULL	*********	NULL	*********
11-Dec-2012	FLOW	0.024	0.100	0.034	NL	NULL	*********	NULL	*********	NULL	*********
14-Jan-2013	FLOW	0.030	0.100	0.038	NL	NULL	*********	NULL	*********	NULL	*********
12-Feb-2013	FLOW	0.036	0.100	0.050	NL	NULL	*********	NULL	*********	NULL	*********
12-Mar-2013	FLOW	0.031	0.100	0.037	NL	NULL	*********	NULL	*********	NULL	*********
15-Apr-2013	FLOW	0.038	0.100	0.048	NL	NULL	*********	NULL	*********	NULL	*********
13-May-2013	FLOW	0.038	0.100	0.049	NL	NULL	*********	NULL	*********	NULL	*********
13-Jun-2013	FLOW	0.036	0.100	0.044	NL	NULL	*********	NULL	*********	NULL	*********
12-Jul-2013	FLOW	0.037	0.100	0.054	NL	NULL	*********	NULL	*********	NULL	*********
12-Aug-2013	FLOW	0.031	0.100	0.035	NL	NULL	*********	NULL	*********	NULL	*********
09-Sep-2013	FLOW	0.032	0.100	0.039	NL	NULL	*********	NULL	*********	NULL	*********
11-Oct-2013	FLOW	0.025	0.100	0.030	NL	NULL	*********	NULL	*********	NULL	*********
13-Nov-2013	FLOW	0.033	0.100	0.045	NL	NULL	*********	NULL	*********	NULL	*********
13-Dec-2013	FLOW	0.032	0.100	0.054	NL	NULL	*********	NULL	*********	NULL	*********
13-Jan-2014	FLOW	0.034	0.100	0.041	NL	NULL	*********	NULL	*********	NULL	*********
12-Feb-2014	FLOW	0.034	0.100	0.048	NL	NULL	*********	NULL	*********	NULL	*********
18-Mar-2014	FLOW	0.033	0.100	0.041	NL	NULL	*********	NULL	*********	NULL	*********
14-Apr-2014	FLOW	0.036	0.100	0.047	NL	NULL	*********	NULL	*********	NULL	*********
12-May-2014	FLOW	0.038	0.100	0.047	NL	NULL	*********	NULL	*********	NULL	*********
12-Jun-2014	FLOW	0.039	0.100	0.055	NL	NULL	*********	NULL	*********	NULL	*********
11-Jul-2014	FLOW	0.033	0.100	0.042	NL	NULL	*********	NULL	*********	NULL	*********
12-Aug-2014	FLOW	0.030	0.100	0.035	NL	NULL	*********	NULL	*********	NULL	*********
11-Jan-2011	NITROGEN, TOTAL - ANNUAL AVERAGE (MG/L)	NULL	*********	NULL	*********	NULL	*********	2.6	4.0	NULL	*********

10-Jan-2012	NITROGEN, TOTAL - ANNUAL AVERAGE (MG/L)	NULL	*********	NULL	*********	NULL	*********	3.7	4.0	NULL	*********
14-Jan-2013	NITROGEN, TOTAL - ANNUAL AVERAGE (MG/L)	NULL	*********	NULL	*********	NULL	*********	1.4	4.0	NULL	*********
13-Jan-2014	NITROGEN, TOTAL - ANNUAL AVERAGE (MG/L)	NULL	*********	NULL	*********	NULL	*********	0.89	4.0	NULL	*********
11-May-2010	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	4.81	NL	NULL	*********
11-Jun-2010	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	4.07	NL	NULL	*********
13-Jul-2010	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	3.64	NL	NULL	*********
11-Aug-2010	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	3.30	NL	NULL	*********
13-Sep-2010	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	3.05	NL	NULL	*********
13-Oct-2010	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	2.89	NL	NULL	*********
12-Nov-2010	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	2.73	NL	NULL	*********
13-Dec-2010	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	2.68	NL	NULL	*********
11-Jan-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	2.6	NL	NULL	*********
10-Feb-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	3.55	NL	NULL	*********
14-Mar-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	11.97	NL	NULL	*********
13-Apr-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	11.09	NL	NULL	*********
11-May-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	8.67	NL	NULL	*********
13-Jun-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	7.18	NL	NULL	*********
12-Jul-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	6.26	NL	NULL	*********
11-Aug-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	5.54	NL	NULL	*********
14-Sep-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	5.03	NL	NULL	*********
12-Oct-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	4.59	NL	NULL	*********
14-Nov-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	4.25	NL	NULL	*********
13-Dec-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	3.96	NL	NULL	*********
10-Jan-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	3.7	NL	NULL	*********
13-Feb-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.4	NL	NULL	*********
13-Mar-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.2	NL	NULL	*********
11-Apr-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.2	NL	NULL	*********
11-May-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.11	NL	NULL	*********
12-Jun-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.1	NL	NULL	*********
11-Jul-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.0	NL	NULL	*********
11-Aug-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.3	NL	NULL	*********
13-Aug-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.1	NL	NULL	*********
11-Oct-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.3	NL	NULL	*********
13-Nov-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.4	NL	NULL	*********
11-Dec-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.4	NL	NULL	*********
14-Jan-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.4	NL	NULL	*********
12-Feb-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.86	NL	NULL	*********
12-Mar-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.95	NL	NULL	*********
15-Apr-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.96	NL	NULL	*********
13-May-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.1	NL	NULL	*********
13-Jun-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.1	NL	NULL	*********
12-Jul-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.0	NL	NULL	*********
12-Aug-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.0	NL	NULL	*********

09-Sep-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.99	NL	NULL	*********
11-Oct-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.98	NL	NULL	*********
13-Nov-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.95	NL	NULL	*********
13-Dec-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.93	NL	NULL	*********
13-Jan-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.89	NL	NULL	*********
12-Feb-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.8	NL	NULL	*********
18-Mar-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.3	NL	NULL	*********
14-Apr-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.2	NL	NULL	*********
12-May-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.1	NL	NULL	*********
12-Jun-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.1	NL	NULL	*********
11-Jul-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.0	NL	NULL	*********
12-Aug-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	1.0	NL	NULL	*********
11-May-2010	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	7.6	9
11-Jun-2010	pH	NULL	*********	NULL	*********	7.1	6	NULL	*********	7.9	9
13-Jul-2010	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	7.7	9
11-Aug-2010	pH	NULL	*********	NULL	*********	7	6	NULL	*********	7.7	9
13-Sep-2010	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	7.5	9
13-Oct-2010	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	7.6	9
12-Nov-2010	pH	NULL	*********	NULL	*********	7.2	6	NULL	*********	7.5	9
13-Dec-2010	pH	NULL	*********	NULL	*********	7.1	6	NULL	*********	7.6	9
11-Jan-2011	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	7.6	9
10-Feb-2011	pH	NULL	*********	NULL	*********	7.1	6	NULL	*********	7.5	9
14-Mar-2011	pH	NULL	*********	NULL	*********	7.1	6	NULL	*********	7.9	9
13-Apr-2011	pH	NULL	*********	NULL	*********	6.5	6	NULL	*********	7.5	9
11-May-2011	pH	NULL	*********	NULL	*********	7.1	6	NULL	*********	7.5	9
13-Jun-2011	pH	NULL	*********	NULL	*********	7.2	6	NULL	*********	7.5	9
12-Jul-2011	pH	NULL	*********	NULL	*********	7.4	6	NULL	*********	7.6	9
11-Aug-2011	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	7.7	9
14-Sep-2011	pH	NULL	*********	NULL	*********	7.1	6	NULL	*********	7.7	9
12-Oct-2011	pH	NULL	*********	NULL	*********	6.6	6	NULL	*********	7.6	9
14-Nov-2011	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	7.7	9
13-Dec-2011	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	7.5	9
10-Jan-2012	pH	NULL	*********	NULL	*********	7.2	6	NULL	*********	7.6	9
13-Feb-2012	pH	NULL	*********	NULL	*********	7.2	6	NULL	*********	7.5	9
13-Mar-2012	pH	NULL	*********	NULL	*********	7.2	6	NULL	*********	7.4	9
11-Apr-2012	pH	NULL	*********	NULL	*********	6.9	6	NULL	*********	7.6	9
11-May-2012	pH	NULL	*********	NULL	*********	7.2	6	NULL	*********	7.6	9
12-Jun-2012	pH	NULL	*********	NULL	*********	7.2	6	NULL	*********	7.9	9
11-Jul-2012	pH	NULL	*********	NULL	*********	7.5	6	NULL	*********	7.9	9
11-Aug-2012	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	7.6	9
13-Aug-2012	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	8	9
11-Oct-2012	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	7.6	9
13-Nov-2012	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	7.6	9

11-Dec-2012	pH	NULL	*********	NULL	*********	7	6	NULL	*********	7.9	9
14-Jan-2013	pH	NULL	*********	NULL	*********	6.4	6	NULL	*********	7.7	9
12-Feb-2013	pH	NULL	*********	NULL	*********	6.6	6	NULL	*********	7.5	9
12-Mar-2013	pH	NULL	*********	NULL	*********	7.1	6	NULL	*********	7.4	9
15-Apr-2013	pH	NULL	*********	NULL	*********	6.5	6	NULL	*********	7.4	9
13-May-2013	pH	NULL	*********	NULL	*********	6.6	6	NULL	*********	7.2	9
13-Jun-2013	pH	NULL	*********	NULL	*********	6.8	6	NULL	*********	7.3	9
12-Jul-2013	pH	NULL	*********	NULL	*********	6.2	6	NULL	*********	7.4	9
12-Aug-2013	pH	NULL	*********	NULL	*********	6.7	6	NULL	*********	7.1	9
09-Sep-2013	pH	NULL	*********	NULL	*********	6.6	6	NULL	*********	7.2	9
11-Oct-2013	pH	NULL	*********	NULL	*********	6.7	6	NULL	*********	7.2	9
13-Nov-2013	pH	NULL	*********	NULL	*********	6.4	6	NULL	*********	7.3	9
13-Dec-2013	pH	NULL	*********	NULL	*********	6.6	6	NULL	*********	7.6	9
13-Jan-2014	pH	NULL	*********	NULL	*********	6.3	6	NULL	*********	7.6	9
12-Feb-2014	pH	NULL	*********	NULL	*********	7.1	6	NULL	*********	7.6	9
18-Mar-2014	pH	NULL	*********	NULL	*********	6.9	6	NULL	*********	7.4	9
14-Apr-2014	pH	NULL	*********	NULL	*********	7	6	NULL	*********	7.3	9
12-May-2014	pH	NULL	*********	NULL	*********	7.1	6	NULL	*********	7.5	9
12-Jun-2014	pH	NULL	*********	NULL	*********	7.3	6	NULL	*********	7.6	9
11-Jul-2014	pH	NULL	*********	NULL	*********	7.1	6	NULL	*********	7.6	9
12-Aug-2014	pH	NULL	*********	NULL	*********	7.2	6	NULL	*********	7.5	9
								10th	6.6	90th	7.7
11-Jan-2011	PHOSPHORUS, TOTAL - ANNUAL AVERAGE (MG/L)	NULL	*********	NULL	*********	NULL	*********	0.19	0.30	NULL	*********
10-Jan-2012	PHOSPHORUS, TOTAL - ANNUAL AVERAGE (MG/L)	NULL	*********	NULL	*********	NULL	*********	0.13	0.30	NULL	*********
14-Jan-2013	PHOSPHORUS, TOTAL - ANNUAL AVERAGE (MG/L)	NULL	*********	NULL	*********	NULL	*********	0.10	0.30	NULL	*********
13-Jan-2014	PHOSPHORUS, TOTAL - ANNUAL AVERAGE (MG/L)	NULL	*********	NULL	*********	NULL	*********	0.12	0.30	NULL	*********
11-May-2010	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.28	NL	NULL	*********
11-Jun-2010	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.26	NL	NULL	*********
13-Jul-2010	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.31	NL	NULL	*********
11-Aug-2010	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.29	NL	NULL	*********
13-Sep-2010	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.26	NL	NULL	*********
13-Oct-2010	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.24	NL	NULL	*********
12-Nov-2010	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.22	NL	NULL	*********
13-Dec-2010	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.21	NL	NULL	*********
11-Jan-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.19	NL	NULL	*********
10-Feb-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.04	NL	NULL	*********
14-Mar-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.050	NL	NULL	*********
13-Apr-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.03	NL	NULL	*********

11-May-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.035	NL	NULL	*********
13-Jun-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.098	NL	NULL	*********
12-Jul-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.11	NL	NULL	*********
11-Aug-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.15	NL	NULL	*********
14-Sep-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.14	NL	NULL	*********
12-Oct-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.14	NL	NULL	*********
14-Nov-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.13	NL	NULL	*********
13-Dec-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.13	NL	NULL	*********
10-Jan-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.13	NL	NULL	*********
13-Feb-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.025	NL	NULL	*********
13-Mar-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.028	NL	NULL	*********
11-Apr-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.085	NL	NULL	*********
11-May-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.10	NL	NULL	*********
12-Jun-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.10	NL	NULL	*********
11-Jul-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.13	NL	NULL	*********
11-Aug-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.12	NL	NULL	*********
13-Aug-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.13	NL	NULL	*********
11-Oct-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.12	NL	NULL	*********
13-Nov-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.11	NL	NULL	*********
11-Dec-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.10	NL	NULL	*********
14-Jan-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.10	NL	NULL	*********
12-Feb-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.035	NL	NULL	*********
12-Mar-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.055	NL	NULL	*********
15-Apr-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.048	NL	NULL	*********
13-May-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.14	NL	NULL	*********
13-Jun-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.12	NL	NULL	*********
12-Jul-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.11	NL	NULL	*********
12-Aug-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.10	NL	NULL	*********
09-Sep-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.086	NL	NULL	*********
11-Oct-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.081	NL	NULL	*********
13-Nov-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.077	NL	NULL	*********
13-Dec-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.072	NL	NULL	*********
13-Jan-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.12	NL	NULL	*********
12-Feb-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.010	NL	NULL	*********
18-Mar-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.015	NL	NULL	*********
14-Apr-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.093	NL	NULL	*********
12-May-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.076	NL	NULL	*********
12-Jun-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.068	NL	NULL	*********
11-Jul-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.075	NL	NULL	*********
12-Aug-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.076	NL	NULL	*********
11-May-2010	TKN (N-KJEL)	83	*1100*	90	*1700*	NULL	*********	0.85	*3.0*	0.91	*4.5*
11-Jun-2010	TKN (N-KJEL)	86	*1100*	100	*1700*	NULL	*********	0.90	*3.0*	1.3	*4.5*
13-Jul-2010	TKN (N-KJEL)	100	*1100*	130	*1700*	NULL	*********	1.0	*3.0*	1.1	*4.5*

11-Aug-2010	TKN (N-KJEL)	82	1100	91	1700	NULL	**********	0.88	3.0	0.98	4.5
13-Sep-2010	TKN (N-KJEL)	79	1100	70	1700	NULL	**********	0.93	3.0	.089	4.5
13-Oct-2010	TKN (N-KJEL)	88	1100	100	1700	NULL	**********	0.97	3.0	1.0	4.5
12-Nov-2010	TKN (N-KJEL)	69	1100	79	1700	NULL	**********	0.74	3.0	0.87	4.5
13-Dec-2010	TKN (N-KJEL)	190	1100	400	1700	NULL	**********	1.7	3.0	3.5	4.5
11-Jan-2011	TKN (N-KJEL)	84	1100	96	1700	NULL	**********	0.97	3.0	0.93	4.5
10-Feb-2011	TKN (N-KJEL)	84	1100	96	1700	NULL	**********	1.2	3.0	2.0	4.5
14-Mar-2011	TKN (N-KJEL)	1700	1100	2800	1700	NULL	**********	17	3.0	28	4.5
13-Apr-2011	TKN (N-KJEL)	320	1100	310	1700	NULL	**********	3.1	3.0	3.1	4.5
11-May-2011	TKN (N-KJEL)	100	1100	140	1700	NULL	**********	1.0	3.0	1.3	4.5
13-Jun-2011	TKN (N-KJEL)	91	1100	97	1700	NULL	**********	0.83	3.0	.094	4.5
12-Jul-2011	TKN (N-KJEL)	93	1100	110	1700	NULL	**********	0.91	3.0	0.97	4.5
11-Aug-2011	TKN (N-KJEL)	77	1100	85	1700	NULL	**********	0.83	3.0	0.92	4.5
14-Sep-2011	TKN (N-KJEL)	72	1100	77	1700	NULL	**********	0.62	3.0	0.73	4.5
12-Oct-2011	TKN (N-KJEL)	52	1100	60	1700	NULL	**********	0.38	3.0	0.44	4.5
14-Nov-2011	TKN (N-KJEL)	75	1100	95	1700	NULL	**********	0.63	3.0	0.82	4.5
13-Dec-2011	TKN (N-KJEL)	80	1100	81	1700	NULL	**********	0.76	3.0	0.86	4.5
10-Jan-2012	TKN (N-KJEL)	64	1100	96	1700	NULL	**********	0.63	3.0	0.90	4.5
13-Feb-2012	TKN (N-KJEL)	89	1100	96	1700	NULL	**********	0.85	3.0	0.90	4.5
13-Mar-2012	TKN (N-KJEL)	88	1100	100	1700	NULL	**********	0.91	3.0	1.03	4.5
11-Apr-2012	TKN (N-KJEL)	100	1100	120	1700	NULL	**********	0.94	3.0	1.11	4.5
11-May-2012	TKN (N-KJEL)	99	1100	110	1700	NULL	**********	0.93	3.0	0.99	4.5
12-Jun-2012	TKN (N-KJEL)	93	1100	110	1700	NULL	**********	0.78	3.0	0.90	4.5
11-Jul-2012	TKN (N-KJEL)	93	1100	110	1700	NULL	**********	0.79	3.0	0.87	4.5
11-Aug-2012	TKN (N-KJEL)	97	1100	130	1700	NULL	**********	0.90	3.0	1.1	4.5
13-Aug-2012	TKN (N-KJEL)	99	1100	110	1700	NULL	**********	0.86	3.0	0.98	4.5
11-Oct-2012	TKN (N-KJEL)	71	1100	98	1700	NULL	**********	0.63	3.0	0.83	4.5
13-Nov-2012	TKN (N-KJEL)	100	1100	150	1700	NULL	**********	0.93	3.0	1.5	4.5
11-Dec-2012	TKN (N-KJEL)	84	1100	110	1700	NULL	**********	0.95	3.0	1.2	4.5
14-Jan-2013	TKN (N-KJEL)	130	1100	240	1700	NULL	**********	1.2	3.0	2.3	4.5
12-Feb-2013	TKN (N-KJEL)	110	1100	150	1700	NULL	**********	0.80	3.0	1.0	4.5
12-Mar-2013	TKN (N-KJEL)	110	1100	140	1700	NULL	**********	0.99	3.0	1.1	4.5
15-Apr-2013	TKN (N-KJEL)	130	1100	170	1700	NULL	**********	0.84	3.0	0.97	4.5
13-May-2013	TKN (N-KJEL)	110	1100	130	1700	NULL	**********	0.83	3.0	0.79	4.5
13-Jun-2013	TKN (N-KJEL)	97	1100	130	1700	NULL	**********	0.74	3.0	0.82	4.5
12-Jul-2013	TKN (N-KJEL)	110	1100	130	1700	NULL	**********	0.80	3.0	1.0	4.5
12-Aug-2013	TKN (N-KJEL)	110	1100	230	1700	NULL	**********	0.93	3.0	1.8	4.5
09-Sep-2013	TKN (N-KJEL)	86	1100	100	1700	NULL	**********	0.72	3.0	0.84	4.5
11-Oct-2013	TKN (N-KJEL)	73	1100	81	1700	NULL	**********	0.79	3.0	0.91	4.5
13-Nov-2013	TKN (N-KJEL)	75	1100	100	1700	NULL	**********	0.62	3.0	0.77	4.5
13-Dec-2013	TKN (N-KJEL)	78	1100	110	1700	NULL	**********	0.63	3.0	0.85	4.5
13-Jan-2014	TKN (N-KJEL)	44	1100	96	1700	NULL	**********	0.33	3.0	0.68	4.5
12-Feb-2014	TKN (N-KJEL)	290	1100	100	1700	NULL	**********	2.4	3.0	0.62	4.5

18-Mar-2014	TKN (N-KJEL)	210	1100	140	1700	NULL	**********	1.6	3.0	0.97	4.5
14-Apr-2014	TKN (N-KJEL)	120	1100	140	1700	NULL	**********	0.89	3.0	0.94	4.5
12-May-2014	TKN (N-KJEL)	130	1100	180	1700	NULL	**********	0.87	3.0	1.09	4.5
12-Jun-2014	TKN (N-KJEL)	130	1100	150	1700	NULL	**********	0.87	3.0	1.0	4.5
11-Jul-2014	TKN (N-KJEL)	100	1100	120	1700	NULL	**********	0.88	3.0	1.0	4.5
12-Aug-2014	TKN (N-KJEL)	92	1100	120	1700	NULL	**********	0.85	3.0	1.2	4.5
11-May-2010	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
11-Jun-2010	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
13-Jul-2010	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
11-Aug-2010	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
13-Sep-2010	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
13-Oct-2010	TSS	0.0017	11	0.0076	17	NULL	**********	0.11	30	0.50	45
12-Nov-2010	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
13-Dec-2010	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
11-Jan-2011	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
10-Feb-2011	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
14-Mar-2011	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
13-Apr-2011	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
11-May-2011	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
13-Jun-2011	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
12-Jul-2011	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
11-Aug-2011	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
14-Sep-2011	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
12-Oct-2011	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
14-Nov-2011	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
13-Dec-2011	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
10-Jan-2012	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
13-Feb-2012	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
13-Mar-2012	TSS	0.079	11	<QL	17	NULL	**********	0.51	30	<QL	45
11-Apr-2012	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
11-May-2012	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
12-Jun-2012	TSS	0.048	11	0.24	17	NULL	**********	0.45	30	2.3	45
11-Jul-2012	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
11-Aug-2012	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
13-Aug-2012	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
11-Oct-2012	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
13-Nov-2012	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
11-Dec-2012	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
14-Jan-2013	TSS	0.019	11	0.075	17	NULL	**********	0.14	30	0.55	45
12-Feb-2013	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
12-Mar-2013	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
15-Apr-2013	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45
13-May-2013	TSS	<QL	11	<QL	17	NULL	**********	<QL	30	<QL	45

13-Jun-2013	TSS	<QL	11	<QL	17	NULL	*********	<QL	30	<QL	45
12-Jul-2013	TSS	<QL	11	<QL	17	NULL	*********	<QL	30	<QL	45
12-Aug-2013	TSS	<QL	11	<QL	17	NULL	*********	<QL	30	<QL	45
09-Sep-2013	TSS	<QL	11	<QL	17	NULL	*********	<QL	30	<QL	45
11-Oct-2013	TSS	<QL	11	<QL	17	NULL	*********	<QL	30	<QL	45
13-Nov-2013	TSS	<QL	11	<QL	17	NULL	*********	<QL	30	<QL	45
13-Dec-2013	TSS	<QL	11	<QL	17	NULL	*********	<QL	30	<QL	45
13-Jan-2014	TSS	0.012	11	0.055	17	NULL	*********	0.11	30	0.50	45
12-Feb-2014	TSS	<QL	11	<QL	17	NULL	*********	<QL	30	<QL	45
18-Mar-2014	TSS	<QL	11	<QL	17	NULL	*********	<QL	30	<QL	45
14-Apr-2014	TSS	0.016	11	0.062	17	NULL	*********	0.13	30	0.50	45
12-May-2014	TSS	0.019	11	0.094	17	NULL	*********	0.11	30	0.55	45
12-Jun-2014	TSS	<QL	11	<QL	17	NULL	*********	<QL	30	<QL	45
11-Jul-2014	TSS	<QL	11	<QL	17	NULL	*********	<QL	30	<QL	45
12-Aug-2014	TSS	<QL	11	<QL	17	NULL	*********	<QL	30	<QL	45

King William VA0088102

The following data was collected after pumping issues at the plant were resolved. Please note that the 7/15/2014 data previously submitted with the permit application is included in this table since it represents current plant operation.

Date	Hardness (mg eq $CaCo_3$/l)	Dissolved Zinc (ug/l)
7/15/2014	71.8	98.2
8/6/2014	106	69.7
8/13/2014	106	86.2
8/14/2014	100	78.9
8/20/2014	109	83.0
8/21/2014	111	64.0
8/26/2014	112	84.0
8/27/2014	94.2	88.0
9/2/2014	116	74.0
9/3/2014	113	96.0

AVG: 103.9

King William VA0088102
Additional Data Results

Date	Hardness (mg eq $CaCo_3$/l)	Dissolved Zinc (ug/l)
7/1/2014	49.6	149
7/2/2014	48.2	137
~~7/10/14~~	~~52.1~~	~~137~~
7/11/2014	53.9	121
7/15/2014	71.8	98

*In previous application submittal of August 5, 2014, the sample was incorrectly identified as being collected on 7/10/2014. A further review of data determined that this sample was taken during the 6/25/2014 sampling event for the Attachment A Water Quality Criteria Monitoring and was reported on the Attachment A reporting form.

King William VA0088102
Additional Data Results

Date	Hardness (mg eq $CaCo_3$/l)	Dissolved Zinc (ug/l)
7/1/2014	49.6	149
7/2/2014	48.2	137
7/10/2014	52.1	137
7/11/2014	53.9	121
7/15/2014	71.8	98

55.12

ATTACHMENT A
DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY CRITERIA MONITORING

Effective January 1, 2012, all analyses shall be in accordance with 1VAC30-45, Certification for Noncommercial Environmental Laboratories, or 1VAC30-46, Accreditation for Commercial Environmental Laboratories.

A listing of Virginia Environmental Laboratory Accreditation Program (VELAP) certified and/or accredited laboratories can be found at the following website:
http://www.dgs.state.va.us/DivisionofConsolidatedLaboratoryServices/Services/EnvironmentalLaboratoryCertification/tabid/1059/Default.aspx

Please be advised that additional water quality analyses may be necessary and/or required for permitting purposes.

CASRN	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
METALS						
7440-36-0	Antimony, dissolved	(3)	1.4	<1.00	G or C	1/5 YR
7440-38-2	Arsenic, dissolved	(3)	1.0	<1.00	G or C	1/5 YR
7440-43-9	Cadmium, dissolved	(3)	0.3	0.14	G or C	1/5 YR
16065-83-1	Chromium III, dissolved [6]	(3)	3.6	<1.00	G or C	1/5 YR
18540-29-9	Chromium VI, dissolved [6]	(3)	1.6	<1.00	G or C	1/5 YR
7440-50-8	Copper, dissolved	(3)	0.50	0.95	G or C	1/5 YR
7439-92-1	Lead, dissolved	(3)	0.50	1.71	G or C	1/5 YR
7439-97-6	Mercury, dissolved	(3)	1.0	<0.10	G or C	1/5 YR
7440-02-0	Nickel, dissolved	(3)	0.94	4.12	G or C	1/5 YR
7782-49-2	Selenium, Total Recoverable	(3)	2.0	<0.50	G or C	1/5 YR
7440-22-4	Silver, dissolved	(3)	0.20	<0.10	G or C	1/5 YR
7440-28-0	Thallium, dissolved	(3)	(4)	<0.10	G or C	1/5 YR
7440-66-6	Zinc, dissolved	(3)	3.6	137	G or C	1/5 YR
PESTICIDES/PCBs						
309-00-2	Aldrin	608/625	0.05	<0.05	G or C	1/5 YR
57-74-9	Chlordane	608/625	LOQ 0.20	ND	G or C	1/5 YR
2921-88-2	Chlorpyrifos (synonym = Dursban)	622	(4)	<0.100	G or C	1/5 YR
72-54-8	DDD	608/625	0.1	<0.05	G or C	1/5 YR
72-55-9	DDE	608/625	0.1	<0.05	G or C	1/5 YR
50-29-3	DDT	608/625	0.1	<0.05	G or C	1/5 YR

CASRN	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
8065-48-3	Demeton (synonym = Dementon-O,S)	622	(4)	<0.100	G or C	1/5 YR
333-41-5	Diazinon	622	(4)	<0.100	G or C	1/5 YR
60-57-1	Dieldrin	608/625	0.1	<0.05	G or C	1/5 YR
959-98-8	Alpha-Endosulfan (synonym = Endosulfan I)	608/625	0.1	<0.05	G or C	1/5 YR
33213-65-9	Beta-Endosulfan (synonym = Endosulfan II)	608625	0.1	<0.05	G or C	1/5 YR
1031-07-8	Endosulfan Sulfate	608/625	0.1	<0.05	G or C	1/5 YR
72-20-8	Endrin	608/625	0.1	<0.05	G or C	1/5 YR
7421-93-4	Endrin Aldehyde	608/625	(4)	<0.05	G or C	1/5 YR
86-50-0	Guthion (synonym = Azinphos Methyl)	622	(4)	<0.100	G or C	1/5 YR
76-44-8	Heptachlor	608/625	0.05	<0.05	G or C	1/5 YR
1024-57-3	Heptachlor Epoxide	608/625	(4)	<0.05	G or C	1/5 YR
319-84-6	Hexachlorocyclohexane Alpha-BHC	608/625	(4)	<0.05	G or C	1/5 YR
319-85-7	Hexachlorocyclohexane Beta-BHC	608/625	(4)	<0.05	G or C	1/5 YR
58-89-9	Hexachlorocyclohexane Gamma-BHC (syn. = Lindane)	608/625	(4)	<0.05	G or C	1/5 YR
143-50-0	Kepone	EPA 8081 B	(4)	<0.20	G or C	1/5 YR
121-75-5	Malathion	614	(4)	<1	G or C	1/5 YR
72-43-5	Methoxychlor	EPA 8081B	(4)	<0.05	G or C	1/5 YR
2385-85-5	Mirex	EPA 8081 B	(4)	<0.05	G or C	1/5 YR
56-38-2	Parathion (synonym = Parathion Ethyl)	614	(4)	<1	G or C	1/5 YR
1336-36-3	PCB, total	608/625	LOQ 7.0	ND	G or C	1/5 YR
8001-35-2	Toxaphene	608/625	LOQ 0.50	ND	G or C	1/5 YR
	BASE NEUTRAL EXTRACTABLES					
83-32-9	Acenaphthene	610/625	10.0	<10.0	G or C	1/5 YR
120-12-7	Anthracene	610/625	10.0	<10.0	G or C	1/5 YR
92-87-5	Benzidine	625	(4)	<10.0	G or C	1/5 YR
56-55-3	Benzo (a) anthracene	610/625	10.0	<10.0	G or C	1/5 YR
205-99-2	Benzo (b) fluoranthene	610/625	10.0	<10.0	G or C	1/5 YR
207-08-9	Benzo (k) fluoranthene	610/625	10.0	<10.0	G or C	1/5 YR
50-32-8	Benzo (a) pyrene	610/625	10.0	<10.0	G or C	1/5 YR
111-44-4	Bis 2-Chloroethyl Ether	625	(4)	<10.0	G or C	1/5 YR

CASRN	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
108-60-1	Bis 2-Chloroisopropyl Ether	625	(4)	<10.0	G or C	1/5 YR
117-81-7	Bis 2-Ethylhexyl Phthalate (syn. = Di-2-Ethylhexyl Phthalate)	625	10.0	<10.0	G or C	1/5 YR
85-68-7	Butyl benzyl phthalate	625	10.0	<10.0	G or C	1/5 YR
91-58-7	2-Chloronaphthalene	625	(4)	<10.0	G or C	1/5 YR
218-01-9	Chrysene	610/625	10.0	<10.0	G or C	1/5 YR
53-70-3	Dibenzo (a,h) anthracene	610/625	20.0	<20.0	G or C	1/5 YR
95-50-1	1,2-Dichlorobenzene	602/624	10.0	<10.0	G or C	1/5 YR
541-73-1	1,3-Dichlorobenzene	602/624	10.0	<10.0	G or C	1/5 YR
106-46-7	1,4-Dichlorobenzene	602/624	10.0	<10.0	G or C	1/5 YR
91-94-1	3,3-Dichlorobenzidine	625	(4)	<10.0	G or C	1/5 YR
84-66-2	Diethyl phthalate	625	10.0	<10.0	G or C	1/5 YR
131-11-3	Dimethyl phthalate	625	(4)	<10.0	G or C	1/5 YR
84-74-2	Di-n-butyl Phthalate (synonym = Dibutyl Phthalate)	625	10.0	<10.0	G or C	1/5 YR
121-14-2	2,4-Dinitrotoluene	625	10.0	<10.0	G or C	1/5 YR
122-66-7	1,2-Diphenylhydrazine	625/ 8270C/8270D	(4)	<10.0	G or C	1/5 YR
206-44-0	Fluoranthene	610/625	10.0	<10.0	G or C	1/5 YR
86-73-7	Fluorene	610/625	10.0	<10.0	G or C	1/5 YR
118-74-1	Hexachlorobenzene	625	(4)	<10.0	G or C	1/5 YR
87-68-3	Hexachlorobutadiene	625	(4)	<10.0	G or C	1/5 YR
77-47-4	Hexachlorocyclopentadiene	625	(4)	<10.0	G or C	1/5 YR
67-72-1	Hexachloroethane	625	(4)	<10.0	G or C	1/5 YR
193-39-5	Indeno(1,2,3-cd)pyrene	610/625	20.0	<20.0	G or C	1/5 YR
78-59-1	Isophorone	625	10.0	<10.0	G or C	1/5 YR
98-95-3	Nitrobenzene	625	10.0	<10.0	G or C	1/5 YR
62-75-9	N-Nitrosodimethylamine	625	(4)	<10.0	G or C	1/5 YR
621-64-7	N-Nitrosodi-n-propylamine	625	(4)	<10.0	G or C	1/5 YR
86-30-6	N-Nitrosodiphenylamine	625	(4)	<10.0	G or C	1/5 YR
129-00-0	Pyrene	610/625	10.0	<10.0	G or C	1/5 YR
120-82-1	1,2,4-Trichlorobenzene	625	10.0	<10.0	G or C	1/5 YR
VOLATILES						

CASRN	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
107-02-8	Acrolein	624	(4)	<50.0	G	1/5 YR
107-13-1	Acrylonitrile	624	(4)	<10.0	G	1/5 YR
71-43-2	Benzene	602/624	10.0	<10.0	G	1/5 YR
75-25-2	Bromoform	624	10.0	<10.0	G	1/5 YR
56-23-5	Carbon Tetrachloride	624	10.0	<10.0	G	1/5 YR
108-90-7	Chlorobenzene (synonym = Monochlorobenzene)	602/624	50.0	<10.0	G	1/5 YR
124-48-1	Chlorodibromomethane	624	10.0	<10.0	G	1/5 YR
67-66-3	Chloroform	624	10.0	<10.0	G	1/5 YR
75-27-4	Dichlorobromomethane	624	10.0	<10.0	G	1/5 YR
107-06-2	1,2-Dichloroethane	624	10.0	<10.0	G	1/5 YR
75-35-4	1,1-Dichloroethylene	624	10.0	<10.0	G	1/5 YR
156-60-5	1,2-trans-dichloroethylene	624	(4)	<10.0	G	1/5 YR
78-87-5	1,2-Dichloropropane	624	(4)	<10.0	G	1/5 YR
542-75-6	1,3-Dichloropropene	624	(4)	<20.0	G	1/5 YR
100-41-4	Ethylbenzene	602/624	10.0	<10.0	G	1/5 YR
74-83-9	Methyl Bromide (synonym = Bromomethane)	624	(4)	<10.0	G	1/5 YR
75-09-2	Methylene Chloride (synonym = Dichloromethane)	624	20.0	<10.0	G	1/5 YR
79-34-5	1,1,2,2-Tetrachloroethane	624	(4)	<10.0	G	1/5 YR
127-18-4	Tetrachloroethylene (synonym = Tetrachloroethene)	624	10.0	<10.0	G	1/5 YR
10-88-3	Toluene	602/624	10.0	<10.0	G	1/5 YR
79-00-5	1,1,2-Trichloroethane	624	(4)	<10.0	G	1/5 YR
79-01-6	Trichloroethylene (synonym = Trichloroethene)	624	10.0	<10.0	G	1/5 YR
75-01-4	Vinyl Chloride	624	10.0	<10.0	G	1/5 YR
ACID EXTRACTABLES						
95-57-8	2-Chlorophenol	625	10.0	<10.0	G or C	1/5 YR
120-83-2	2,4 Dichlorophenol	625	10.0	<10.0	G or C	1/5 YR
105-67-9	2,4 Dimethylphenol	625	10.0	<10.0	G or C	1/5 YR
51-28-5	2,4-Dinitrophenol	625	(4)	<10.0	G or C	1/5 YR
534-52-1	2-Methyl-4,6-Dinitrophenol	625	(4)	<10.0	G or C	1/5 YR
25154-52-3	Nonylphenol	ASTM D 7065-06	(4)	<10.0	G or C	1/5 YR

CASRN	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
87-86-5	Pentachlorophenol	625	50.0	<20.0	G or C	1/5 YR
108-95-2	Phenol	625	10.0	<10.0	G or C	1/5 YR
88-06-2	2,4,6-Trichlorophenol	625	10.0	<10.0	G or C	1/5 YR
	MISCELLANEOUS					
776-41-7	Ammonia as NH3-N	Lachat 10-107-06-1-C	200	<0.20 mg/l	C	1/5 YR
16887-00-6	Chloride	(3)	(4)	87	C	1/5 YR
7782-50-5	Chlorine, Total Residual	(3)	100	NA/UV	G	1/5 YR
57-12-5	Cyanide, Total [8]	ASTM 4282-02	10.0	<10.0	G	1/5 YR
N/A	*E. coli* / *Enterococcus* (N/CML)	(3)	(4)	<1	G	1/5 YR
18496-25-8	Sulfide, dissolved [7]	ASTM D4658-08	100	<0.11	G or C	1/5 YR
60-10-5	Tributyltin	(5)	(4)	<0.03	G or C	1/5 YR
471-34-1	Hardness (mg/L as $CaCO_3$)	(3)	(4)	52.1	G or C	1/5 YR

Edward G. Henifin, P.E. General Manager

Name of Principal Executive Officer or Authorized Agent & Title

8/5/2014

Signature of Principal Executive Officer or Authorized Agent & Date

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations. See 18 U.S.C. Sec. 1001 and 33 U.S.C. Sec. 1319. (Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)

FOOTNOTES:

(1) Quantification level (QL) means the minimum levels, concentrations, or quantities of a target variable (e.g. target analyte) that can be reported with a specified degree of confidence in accordance with 1VAC30-45, Certification for Noncommercial Environmental Laboratories, or 1VAC30-46, Accreditation for Commercial Environmental Laboratories.

The quantification levels indicated for the metals are actually Specific Target Values developed for this permit. The Specific Target Value is the approximate value that may initiate a wasteload allocation analysis. Target values are not wasteload allocations or effluent limitations. The Specific Target Values are subject to change based on additional information such as hardness data, receiving stream flow, and design flows.

Units for the quantification level are micrograms/liter unless otherwise specified.

Quality control and quality assurance information (i.e. laboratory certificates of analysis) shall be submitted to document that the required quantification level has been attained.

(2) Sample Type

G = Grab = An individual sample collected in less than 15 minutes. Substances specified with "grab" sample type shall only be collected as grabs. The permittee may analyze multiple grabs and report the average results provided that the individual grab results are also reported. For grab metals samples, the individual samples shall be filtered and preserved immediately upon collection.

C = Composite = A 24-hour composite unless otherwise specified. The composite shall be a combination of individual samples, taken proportional to flow, obtained at hourly or smaller time intervals. The individual samples may be of equal volume for flows that do not vary by +/- 10 percent over a 24-hour period.

(3) A specific analytical method is not specified; however, an appropriate method to meet the QL shall be selected from any approved method presented in 40 CFR Part 136.

(4) The QL is at the discretion of the permittee. If the test result is less than the method QL, a "<[QL]" shall be reported where the actual analytical test QL is substituted for [QL].

(5) Analytical Methods: Analysis of Butyltins in Environmental Systems by the Virginia Institute of Marine Science, dated November 1996 (currently the only Virginia Environmental Laboratory Accreditation Program (VELAP) accredited method).

(6) Both Chromium III and Chromium VI may be measured by the total chromium analysis. The total chromium analytical test QL shall be less than or equal to the lesser of the Chromium III or Chromium VI method QL listed above. If the result of the total chromium analysis is less than the analytical test QL, both Chromium III and Chromium VI can be reported as "<[QL]", where the actual analytical test QL is substituted for [QL].

(7) Dissolved sulfide may be measured by the total sulfide analysis. The total sulfide analytical test QL shall be less than or equal to the dissolved sulfide method QL listed above. If the result of the total sulfide analysis is less than the analytical test QL, dissolved sulfide can be reported as "<[QL]", where the actual analytical test QL is substituted for [QL].

(8) Free cyanide may be measured by the total cyanide analysis. The total cyanide analytical test QL shall be less than or equal to the free cyanide method QL listed above. If the result of the total cyanide analysis is less than the analytical test QL, free cyanide can be reported as "<[QL]", where the actual analytical test QL is substituted for [QL].

ATTACHMENT 8

Mixing Analysis

Mixing Zone Predictions for HRSD - King William STP

Effluent Flow = 0.1 MGD
Stream 7Q10 = 0.23 MGD
Stream 30Q10 = 0.49 MGD
Stream 1Q10 = 0.14 MGD
Stream slope = 0.0038 ft/ft
Stream width = 30 ft
Bottom scale = 3
Channel scale = 1

Low Flow

Mixing Zone Predictions @ 7Q10

Depth = .097 ft
Length = 5979.11 ft
Velocity = .1755 ft/sec
Residence Time = .3943 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .1376 ft
Length = 4459.64 ft
Velocity = .2212 ft/sec
Residence Time = .2333 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .0801 ft
Length = 7018.91 ft
Velocity = .1546 ft/sec
Residence Time = 12.6107 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 7.93% of the 1Q10 is used.

Mixing Zone Predictions for HRSD - King William STP

Effluent Flow = 0.1 MGD
Stream 7Q10 = 3.3 MGD
Stream 30Q10 = 5.1 MGD
Stream 1Q10 = 2.4 MGD
Stream slope = 0.0038 ft/ft
Stream width = 30 ft
Bottom scale = 3
Channel scale = 1

High Flow

Mixing Zone Predictions @ 7Q10

Depth = .3962 ft
Length = 1826.78 ft
Velocity = .4427 ft/sec
Residence Time = .0478 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .5129 ft
Length = 1465.86 ft
Velocity = .5231 ft/sec
Residence Time = .0324 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .3289 ft
Length = 2139.45 ft
Velocity = .3922 ft/sec
Residence Time = 1.5154 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 65.99% of the 1Q10 is used.

ATTACHMENT 9

Ammonia Reasonable Potential Analysis

10/17/2014 3:00:59 PM

Facility = HRSD - King William STP
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 26.7
WLAc = 20.4
Q.L. = 0.2
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

9

ATTACHMENT 10

Reasonable Potential Analysis
Metals

9/15/2014 2:44:08 PM

Facility = HRSD - King William
Chemical = Copper
Chronic averaging period = 4
WLAa = 14
WLAc = 15
Q.L. = 5.7
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value =
Variance =
C.V. =
97th percentile daily values =
97th percentile 4 day average =
97th percentile 30 day average=
< Q.L. = 1
Model used =

No Limit is required for this material

The data are:

0.95

9/15/2014 2:45:06 PM

Facility = HRSD - King William
Chemical = Lead
Chronic averaging period = 4
WLAa = 120
WLAc = 16
Q.L. = 9.6
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value =
Variance =
C.V. =
97th percentile daily values =
97th percentile 4 day average =
97th percentile 30 day average=
< Q.L. = 1
Model used =

No Limit is required for this material

The data are:

1.71

9/15/2014 2:45:50 PM

Facility = HRSD - King William
Chemical = Nickel
Chronic averaging period = 4
WLAa = 190
WLAc = 34
Q.L. = 20
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value =
Variance =
C.V. =
97th percentile daily values =
97th percentile 4 day average =
97th percentile 30 day average=
< Q.L. = 1
Model used =

No Limit is required for this material

The data are:

4.12

9/15/2014 2:46:53 PM

Facility = HRSD - King William
Chemical = Zinc
Chronic averaging period = 4
WLAa = 130
WLAc = 200
Q.L. = 50
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = 82.2864
Variance = 125.353
C.V. = 0.136063
97th percentile daily values = 105.192
97th percentile 4 day average = 93.2904
97th percentile 30 day average= 86.1314
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

98.2
69.7
86.2
78.9
83
64
84
88
74
96

ATTACHMENT 11

March 2004 Stream Model

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4949-A Cox Road, Glen Allen, VA 23060-6296 804/527-5020

SUBJECT: Stream Sanitation Analysis – Moncuin Creek
HRSD-King William STP discharge (VA0088102)

TO: Gina Ebbett

FROM: Jennifer Palmore

DATE: March 3, 2004

COPIES: Mark Alling, Model File

A request for a stream sanitation analysis for the HRSD-King William sewage treatment plant (STP) discharge was received on February 3, 2004. The request was submitted because the permittee has requested a tiered increase in design flow from the current 0.025 MGD to 0.05, 0.1, and finally 0.15 MGD.

The STP discharges into Moncuin Creek near Manquin in King William County. The current limits were recommended by Jon van Soestbergen in 1997 (memo attached). At that time, the flow frequency analysis indicated that the 7Q10 of Moncuin Creek was 0.0 cfs. The analysis was performed by correlating stream measurements taken on Acquinton Creek at the Route 629 bridge (#01673620) with the stream gauge on Totopotomoy Creek near Studley (#0167000) and then doing a drainage area comparison between Acquinton and Moncuin Creeks. As the 7Q10 was 0.0 cfs, the stream was determined to be unmodelable and limits were recommended based on best professional judgement. However, the memo indicates that the stream was free flowing at the discharge point with a marshy area 1.6 miles downstream that should be used as a boundary condition at which DEQ swamp limits would be applied in any future modeling.

An updated flow frequency analysis was performed on 1/8/2004. Acquinton Creek was deemed to be a poor comparison to Moncuin and the flow frequencies were recalculated by drainage area comparison between Moncuin and Totopotomoy Creeks. The analysis indicated a 7Q10 flow of 0.15 cfs, indicating that there is flow at 7Q10 conditions.

A site visit was performed on March 2, 2004. As previously stated, the stream has a defined channel and stream flow was high. Moncuin Creek was therefore modeled using Regional Model 4.1. The stream is deemed a Tier 1 water because it is currently on the 303(d) list Total Maximum Daily Load Priority List as impaired of the Aquatic Life Use due to violations of the pH standard. The impairment is attributed to natural conditions. The stream is also impaired of the Recreation Use due to fecal coliform exceedances, however this is not a factor in the Tier determination.

The following discharge limits are recommended to maintain water quality standards in Moncuin Creek and to meet the DEQ swamp limits at the downstream boundary:

Q = 0.05 MGD	Q = 0.1 MGD	Q = 0.15 MGD
$cBOD_5$ = 19 mg/L	$cBOD_5$ = 13 mg/L	$cBOD_5$ = 10 mg/L
TKN = 3 mg/L	TKN = 3 mg/L	TKN = 3 mg/L
DO = 5 mg/L	DO = 5 mg/L	DO = 5 mg/L

The modeling documentation is attached. If you have any questions or need any additional information, please do not hesitate to contact me.

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to MONCUIN CREEK.

File Information

File Name:	E:\models\HRSD King William 0.05 mgd.mod
Date Modified:	March 03, 2004

Water Quality Standards Information

Stream Name:	MONCUIN CREEK
River Basin:	York River Basin
Section:	3
Class:	III - Nontidal Waters (Coastal and Piedmont)
Special Standards:	None

Background Flow Information

Gauge Used:	01673550 Totopotomoy Creek near Studley
Gauge Drainage Area:	26.2 Sq.Mi.
Gauge 7Q10 Flow:	0.28 MGD
Headwater Drainage Area:	9.01 Sq.Mi.
Headwater 7Q10 Flow:	9.629007E-02 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	0 MGD
Incremental Flow in Segments:	1.068702E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	24 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	7.621368 mg/l

Model Segmentation

Number of Segments:	1
Model Start Elevation:	19 ft above MSL
Model End Elevation:	7 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to MONCUIN CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	VA0088102 - HRSD KING WILLIAM STP
VPDES Permit No.:	VA0088102

Discharger Flow Information

Flow:	0.05 MGD
cBOD5:	19 mg/l
TKN:	3 mg/l
D.O.:	5 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	1.6 miles
Upstream Drainage Area:	9.01 Sq.Mi.
Downstream Drainage Area:	0 Sq.Mi.
Upstream Elevation:	19 Ft.
Downstream Elevation:	7 Ft.

Hydraulic Information

Segment Width:	1.5 Ft.
Segment Depth:	0.185 Ft.
Segment Velocity:	0.815 Ft./Sec.
Segment Flow:	0.146 MGD
Incremental Flow:	-0.096 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Wide Shallow Arc
Character:	Moderately Meandering
Pool and Riffle:	No
Bottom Type:	Silt
Sludge:	None
Plants:	None
Algae:	None

"Model Run For E:\models\HRSD King William 0.05 mgd.mod On 3/3/04 10:43:41 AM"

"Model is for MONCUIN CREEK."
"Model starts at the VA0088102 - HRSD KING WILLIAM STP discharge."

"Background Data"

"7Q10"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.0963,	2,	0,	7.621,	24

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.05,	19,	3,	,5,	25

"Hydraulic Information for Segment 1"

"Length"	"Width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
1.6,	1.5,	.185,	.815

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"cBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.1463,	6.725,	19.526,	0,	8.422,	24.34179

"Rate Constants for Segment 1. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1.2,	1.465,	4.5,	4.988,	.35,	.489,	0,	0

"Output for Segment 1"
"Segment starts at VA0088102 - HRSD KING WILLIAM STP"

"Total"	"Segm."			
"Dist."	"Dist."	"DO"	"cBOD"	"nBOD"
"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
0,	0,	6.725,	19.526,	0
.1,	.1,	6.578,	19.313,	0
.2,	.2,	6.439,	19.102,	0
.3,	.3,	6.307,	18.893,	0
.4,	.4,	6.182,	18.687,	0
.5,	.5,	6.064,	18.483,	0
.6,	.6,	5.952,	18.281,	0
.7,	.7,	5.847,	18.081,	0
.8,	.8,	5.748,	17.883,	0
.9,	.9,	5.654,	17.688,	0
1,	1,	5.566,	17.495,	0
1.1,	1.1,	5.483,	17.304,	0
1.2,	1.2,	5.405,	17.115,	0
1.3,	1.3,	5.332,	16.928,	0
1.4,	1.4,	5.264,	16.743,	0
1.5,	1.5,	5.2,	16.56,	0

1.6, 1.6, 5.141, 16.379, 0

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to MONCUIN CREEK.

File Information

File Name:	E:\models\HRSD King William 0.1 mgd.mod
Date Modified:	March 03, 2004

Water Quality Standards Information

Stream Name:	MONCUIN CREEK
River Basin:	York River Basin
Section:	3
Class:	III - Nontidal Waters (Coastal and Piedmont)
Special Standards:	None

Background Flow Information

Gauge Used:	01673550 Totopotomoy Creek near Studley
Gauge Drainage Area:	26.2 Sq.Mi.
Gauge 7Q10 Flow:	0.28 MGD
Headwater Drainage Area:	9.01 Sq.Mi.
Headwater 7Q10 Flow:	9.629007E-02 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	0 MGD
Incremental Flow In Segments:	1.068702E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	24 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	7.621368 mg/l

Model Segmentation

Number of Segments:	1
Model Start Elevation:	19 ft above MSL
Model End Elevation:	7 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to MONCUIN CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	VA0088102 - HRSD KING WILLIAM STP
VPDES Permit No.:	VA0088102

Discharger Flow Information

Flow:	0.1 MGD
cBOD5:	13 mg/l
TKN:	3 mg/l
D.O.:	5 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	1.6 miles
Upstream Drainage Area:	9.01 Sq.Mi.
Downstream Drainage Area:	0 Sq.Mi.
Upstream Elevation:	19 Ft.
Downstream Elevation:	7 Ft.

Hydraulic Information

Segment Width:	1.75 Ft.
Segment Depth:	0.192 Ft.
Segment Velocity:	0.904 Ft./Sec.
Segment Flow:	0.196 MGD
Incremental Flow:	-0.096 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Wide Shallow Arc
Character:	Moderately Meandering
Pool and Riffle:	No
Bottom Type:	Silt
Sludge:	None
Plants:	None
Algae:	None

"Model Run For E:\models\HRSD King William 0.1 mgd.mod On 3/3/04 10:52
:49 AM"

"Model is for MONCUIN CREEK."
"Model starts at the VA0088102 - HRSD KING WILLIAM STP discharge."

"Background Data"

"7Q10",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.0963,	2,	0,	7.621,	24

"Discharge/Tributary Input Data for Segment 1"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.1,	13,	3,	,5,	25

"Hydraulic Information for Segment 1"

"Length",	"Width",	"Depth",	"Velocity"
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"
1.6,	1.75,	.192,	.904

"Initial Mix Values for Segment 1"

"Flow",	"DO",	"cBOD",	"nBOD",	"DOSat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.1963,	6.286,	19.01,	0,	8.399,	24.50945

"Rate Constants for Segment 1. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
1.2,	1.476,	4.5,	5.008,	.35,	.495,	0,	0

"Output for Segment 1"
"Segment starts at VA0088102 - HRSD KING WILLIAM STP"

"Total",	"Segm."			
"Dist.",	"Dist.",	"DO",	"cBOD",	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
0,	0,	6.286,	19.01,	0
.1,	.1,	6.171,	18.821,	0
.2,	.2,	6.061,	18.634,	0
.3,	.3,	5.957,	18.449,	0
.4,	.4,	5.858,	18.266,	0
.5,	.5,	5.764,	18.085,	0
.6,	.6,	5.675,	17.905,	0
.7,	.7,	5.591,	17.727,	0
.8,	.8,	5.511,	17.551,	0
.9,	.9,	5.436,	17.377,	0
1,	1,	5.365,	17.204,	0
1.1,	1.1,	5.298,	17.033,	0
1.2,	1.2,	5.235,	16.864,	0
1.3,	1.3,	5.176,	16.697,	0
1.4,	1.4,	5.12,	16.531,	0
1.5,	1.5,	5.068,	16.367,	0

1.6, 1.6, 5.019, 16.204, 0

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to MONCUIN CREEK.

File Information

File Name:	E:\models\HRSD King William.mod
Date Modified:	March 02, 2004

Water Quality Standards Information

Stream Name:	MONCUIN CREEK
River Basin:	York River Basin
Section:	3
Class:	III - Nontidal Waters (Coastal and Piedmont)
Special Standards:	None

Background Flow Information

Gauge Used:	01673550 Totopotomoy Creek near Studley
Gauge Drainage Area:	26.2 Sq.Mi.
Gauge 7Q10 Flow:	0.28 MGD
Headwater Drainage Area:	9.01 Sq.Mi.
Headwater 7Q10 Flow:	9.629007E-02 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	0 MGD
Incremental Flow in Segments:	1.068702E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	24 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	7.621368 mg/l

Model Segmentation

Number of Segments:	1
Model Start Elevation:	19 ft above MSL
Model End Elevation:	7 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to MONCUIN CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	VA0088102 - HRSD KING WILLIAM STP
VPDES Permit No.:	VA0088102

Discharger Flow Information

Flow:	0.15 MGD
cBOD5:	10 mg/l
TKN:	3 mg/l
D.O.:	5 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	1.6 miles
Upstream Drainage Area:	9.01 Sq.Mi.
Downstream Drainage Area:	0 Sq.Mi.
Upstream Elevation:	19 Ft.
Downstream Elevation:	7 Ft.

Hydraulic Information

Segment Width:	1.75 Ft.
Segment Depth:	0.241 Ft.
Segment Velocity:	0.904 Ft./Sec.
Segment Flow:	0.246 MGD
Incremental Flow:	-0.096 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Wide Shallow Arc
Character:	Moderately Meandering
Pool and Riffle:	No
Bottom Type:	Silt
Sludge:	None
Plants:	None
Algae:	None

"Model Run For E:\models\HRSD King William.mod On 3/3/04 10:54:00 AM"

"Model is for MONCUIN CREEK."
"Model starts at the VA0088102 - HRSD KING WILLIAM STP discharge."

"Background Data"

"7Q10",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.0963,	2,	0,	7.621,	24

"Discharge/Tributary Input Data for Segment 1"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.15,	10,	3,	,5,	25

"Hydraulic Information for Segment 1"

"Length",	"Width",	"Depth",	"Velocity"
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"
1.6,	1.75,	.241,	.904

"Initial Mix Values for Segment 1"

"Flow",	"DO",	"cBOD",	"nBOD",	"DOSat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.2463,	6.025,	17.181,	0,	8.385,	24.60904

"Rate Constants for Segment 1. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
1.2,	1.483,	4.5,	5.02,	.35,	.499,	0,	0

"Output for Segment 1"
"Segment starts at VA0088102 - HRSD KING WILLIAM STP"

"Total",	"Segm."			
"Dist.",	"Dist.",	"DO",	"cBOD",	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
0,	0,	6.025,	17.181,	0
.1,	.1,	5.935,	17.01,	0
.2,	.2,	5.85,	16.84,	0
.3,	.3,	5.769,	16.672,	0
.4,	.4,	5.693,	16.506,	0
.5,	.5,	5.621,	16.341,	0
.6,	.6,	5.553,	16.178,	0
.7,	.7,	5.489,	16.017,	0
.8,	.8,	5.429,	15.857,	0
.9,	.9,	5.372,	15.699,	0
1,	1,	5.319,	15.542,	0
1.1,	1.1,	5.269,	15.387,	0
1.2,	1.2,	5.222,	15.234,	0
1.3,	1.3,	5.178,	15.082,	0
1.4,	1.4,	5.137,	14.932,	0
1.5,	1.5,	5.099,	14.783,	0
1.6,	1.6,	5.064,	14.636,	0

"END OF FILE"

ATTACHMENT 12

Public Notice

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in King William County, Virginia. This permit will be issued for a new term and will supersede the previous permit.

PUBLIC COMMENT PERIOD: TBD, 2014 to TBD, 2014

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board.

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Hampton Roads Sanitation District
P.O. Box 5911, Virginia Beach, VA 23471-0911
VA0088102

NAME AND ADDRESS OF FACILITY: King William Sewage Treatment Plant
542 Acquinton Church Road, King William, VA 23086

PROJECT DESCRIPTION: Hampton Roads Sanitation District has applied for a reissuance of a permit for the public King William Sewage Treatment Plant. The applicant proposes to release treated sewage wastewaters from residential areas at a rate of 0.1 million gallons per day into a water body. Generated sludge from the treatment process will be transported to the HRSD – West Point Sewage Treatment Plant (VA0075434) for further treatment and final disposal. The facility proposes to release the treated sewage in the Moncuin Creek in King William County in the York River watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: pH, carbonaceous-biochemical oxygen demand-5 day, total suspended solids, dissolved oxygen, total Kjeldahl nitrogen, *E. coli*, total nitrogen and total phosphorus. The permit also requires monitoring and reporting for flow, total hardness and total recoverable zinc.

This facility is subject to the requirements of 9VAC25-820 and is registered under the HRSD York River Aggregate for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by hand-delivery, email, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the draft permit and application at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.

Name: Douglas Frasier
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3873 Email: Douglas.Frasier@deq.virginia.gov Fax: (703) 583-3821